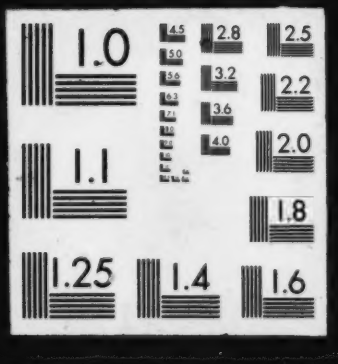
1 OF 2
PB86
212263



PB86-212263

Interim Status Surface Impoundments Retrofitting Variances

Labat-Anderson, Inc., Arlington, VA

Prepared for

Environmental Protection Agency, Washington, DC

8 Jul 86

U.S. Department of Commerce
National Technical Information Service
NTIS

OSWER Policy Directive 9894.00-1B

EPA/530-SW-86-017

PB86-212263

INTERIM STATUS SURFACE IMPOUNDMENTS RETROFITTING VARIANCES

Guidance Document

July 8, 1986

Prepared for

Land Disposal Branch
Waste Management Division
Office of Solid Waste
U.S. Environmental Protection Agency

Contract Number 68-01-7237
Task 4

Prepared by

LABAT-ANDERSON Incorporated
1111 19th Street North, Suite 600
Arlington, Virginia 22009

REPRODUCED BY
NATIONAL TECHNICAL
INFORMATION SERVICE
U.S. DEPARTMENT OF COMMERCE
SPRINGFIELD, VA. 22161

50272-101

REPORT DOCUMENTATION PAGE	1. REPORT NO. EPA/530-SW-86-017	2.	3. Recipient's Accession No. PB86 212263/AS
4. Title and Subtitle: Interim Status Surface Impoundments Retrofitting Variances - Guidance Document			5. Report Date: June, 1986 6.
7. Author(s): U.S. Environmental Protection Agency			8. Performing Organization Rept. No. -
9. Performing Organization Name and Address: U.S. Environmental Protection Agency, Office Of Solid Waste, Land Disposal Branch, 401 M Street, S.W., Washington, D.C. 20460			10. Project/Task/Work Unit No. Task 4 11. Contract(C) or Grant(G) No. (C) 68-01-7237 (G)
12. Sponsoring Organization Name and Address: U.S. Environmental Protection Agency, Office of Solid Waste, Land Disposal Branch, 401 M Street, S.W., Washington, D.C. 20460			13. Type of Report & Period Covered: Final 14.

15. Supplementary Notes

Prepared by LABAT-ANDERSON Incorporated

16. Abstract (Limit: 200 words)

This document supports Section 3005(j) of the Resource Conservation and Recovery Act (RCRA) as amended by the Hazardous and Solid Waste Act of 1984 (HSWA). Section 3005(j) requires that each surface impoundment that was in existence on November 8, 1984, and that qualified to operate under interim status shall not receive, store, or treat hazardous waste after November 8, 1988, unless the impoundment is in compliance with the minimum technological requirements or the owner/operator seeks and is granted an exemption from retrofitting. The first section of the document addresses administrative and procedural matters relating to exemption applications. Successive sections of the document discuss the type of information that owners/operators should submit if they are interested in obtaining one of the four exemptions under Section 3005(j).

17. Document Analysis a. Descriptors

b. Identifiers/Open-Ended Terms

c. COSATI Field/Group

18. Availability Statement	19. Security Class (This Report)	21. No. of Pages
Release unlimited	unclassified	
	20. Security Class (This Page) unclassified	22. Price

(See ANSI-Z39.18) See Instructions on Reverse OPTIONAL FORM 272 (4-77) (Formerly NTIS-35) Department of Commerce

CONTENTS

Section

1. Introduction and Administrative Requirements 1-1
1.1 National Policy Goals 1-1
1.1.1 Minimum Technological Requirements 1-1
1.1.2 The Requirement to Retrofit 1-2
1.1.3 The Affected Community 1-2
1.1.4 The Availability of Exemptions 1-2
1.2 The Purpose of this Manual 1-3
1.2.1 Interaction of 3005(j) and Land Disposal Prohibition 1-3
1.3 Procedures for Submitting and Processing Applications for Exemptions 1-4
1.3.1 Integration of the Processing of Permits and Exemptions 1-5
1.3.2 Determination of the Completeness of the Application 1-6
1.3.3 Public Notice and Opportunity to Comment 1-7
1.3.4 Final Determinations 1-8
1.3.5 Exemption Applications for Surface Impoundments that Become Subject to RCRA in the Future 1-9
1.3.6 Additional Procedural Information 1-9
1.4 Timing of Closure 1-10

2. First Exemption 2-1
2.1 Statutory Provisions 2-1
2.2 Guidance for the First Exemption 2-1
2.2.1 Demonstrate That the Liner is Adequately Designed, Constructed, Installed, and Operated . . 2-2
2.2.2 Demonstrate That the Liner is Not Leaking 2-4
2.2.3 Demonstrate Impoundment Location Relative to Underground Source of Drinking Water 2-7
2.2.4 Demonstrate Compliance with Generally Applicable Ground Water Monitoring Programs 2-10
2.3 Changes in Condition Causing the First Exemption to be Revoked 2-11

3. Second Exemption 3-1
3.1 Statutory Provisions 3-1
3.2 Guidance for 3005(j)(3)(A) 3-2
3.2.1 Aggressive Biological Treatment Facility 3-2
3.2.1.1 Description of Secondary Treatment Systems 3-4
3.2.1.1.1 Activated Sludge Systems . . . 3-4
3.2.1.1.2 Fixed Film Systems 3-5
3.2.1.1.3 Waste Stabilization Ponds . . 3-6
3.2.1.2 Secondary Treatment Systems that Qualify as Aggressive Biological Treatment Facilities 3-7

CONTENTS (continued)

Section

3. Second Exemption (continued)
- 3.2.2 Changes in Condition 3-9
- 3.3 Guidance for 3005(j)(3)(B) 3-10
  - 3.3.1 Evidence Regarding Leakage 3-10
  - 3.3.2 Changes in Condition 3-14
- 3.4 Guidance for 3005(j)(3)(C) 3-15
  - 3.4.1 Definitions of NPDES Terms 3-15
  - 3.4.2 Scope of Provisions 3-17
    - 3.4.2.1 Facilities with BAT Permits 3-17
    - 3.4.2.2 Facilities with BPT Permits 3-18
      - 3.4.2.2.1 Facilities With BPT Permits for Which Effluent Guidelines are in Effect 3-18
      - 3.4.2.2.2 Facilities With BPT Permits for Which No Effluent Guidelines are in Effect. 3-19
  - 3.4.3 Meaning of "In Compliance" for Purposes of 3005(j)(3)(C) 3-21
    - 3.4.3.1 Initial Determination 3-21
    - 3.4.3.2 Change in Condition 3-25
- 3.5 Procedure for Obtaining an Exemption 3-25
  - 3.5.1 Sources of Information for the Regulatory Agency 3-28
  - 3.5.2 Inter- and Intra-Agency Coordination in the Decisionmaking Process 3-30

4. Third Exemption 4-1
- 4.1 Statutory Provisions 4-1
- 4.2 Guidance for the Third Exemption 4-1
  - 4.2.1 Demonstration of "No Migration" Based on Test and Model Data 4-3
    - 4.2.1.1 Meaning of "Ground Water or Surface Water" 4-4
    - 4.2.1.2 Meaning of "Hazardous Constituent" . . . 4-4
    - 4.2.1.3 Demonstration of "No Migration" 4-4
    - 4.2.1.4 Documentation Requirements 4-6
  - 4.2.2 Demonstration of "No Migration" Based on Inward Hydraulic Gradient 4-7
    - 4.2.2.1 Pump Capacity and Reliability 4-8
    - 4.2.2.2 Flooding 4-8
    - 4.2.2.3 Piping 4-8
    - 4.2.2.4 Water-Table Fluctuations 4-8
    - 4.2.2.5 Uniformity of Head in Impoundment 4-9
    - 4.2.2.6 Fluid Density 4-10
    - 4.2.2.7 Aquifer Nonuniformity 4-11

CONTENTS (continued)

Section

4. Third Exemption (continued)
4.2.2.8 Cleanup at Closure 4-11
4.2.2.9 Sites with Vulnerable Hydrogeology . . . 4-12
4.2.3 Changes in Conditions Causing an Exemption to be Revoked 4-13

5. Fourth Exemption 5-1
5.1 Statutory Provisions 5-1
5.2 Guidance for the Fourth Exemption 5-1

References Ref-1

Appendices

A. Hazardous and Solid Waste Amendments of 1984 . . . . . A-1

B. Potential Sources of Information on the Location of Aquifers Identified as Underground Sources of Drinking Water B-1

Figure 1 Examples of underground sources of drinking water within one-quarter mile of a hazardous waste surface impoundment . 2-8

SECTION 1

INTRODUCTION AND ADMINISTRATIVE REQUIREMENTS

1.1 NATIONAL POLICY GOALS

In the Hazardous and Solid Waste Amendments of 1984 (HSWA), Congress declared it to be the national policy of the United States that

> . . . wherever feasible, the generation of hazardous waste is to be reduced or eliminated as expeditiously as possible. Waste that is nevertheless generated should be treated, stored, or disposed of so as to minimize the present and future threat to human health and the environment.

To achieve this, the regulations implementing the Resource Conservation and Recovery Act of 1976 (RCRA) now provide for a broad protective system that is intended: (1) to prevent leachate from migrating from impoundments that contain hazardous wastes; (2) to detect any migration that does occur; and (3) to minimize such migration. This protective system encompasses the active life of impoundments, the period while they are being closed, and the period after they have been closed.

1.1.1 Minimum Technological Requirements

To achieve these goals, HSWA established Minimum Technological Requirements for each new surface impoundment (including replacements and expansions) that will be used to treat, store, or dispose of hazardous waste. Section 3004(o)(1)(A) of RCRA, as amended by HSWA, now requires such surface impoundments to have two or more liners, a leachate collection system between the liners, and ground water monitoring. Section 3004(o)(5) gives EPA until November 8, 1986, to promulgate regulations or to issue guidance implementing the Minimum Technological Requirements. Current guidance on the Minimum Technological Requirements may be found in EPA's "Guidance on Implementation of the Minimum Technological Requirements of HSWA of 1984, Respecting Liners and Leachate Collection Systems" (EPA, 1985a) and in "Draft Minimum Technology Guidance on Double Liner Systems for Landfills and Surface Impoundments--Design, Construction, and Operation" (EPA, 1985b).

RCRA also provides for the possibility "that alternative design and operating practices, together with location characteristics, will prevent the migration of any hazardous constituents into the ground water or surface water at least as effectively as liners and leachate collection systems" (Section 3004(o)(2)).

1.1.2 The Requirement to Retrofit

Section 215 of HSWA amended RCRA by adding subsection (j) to Section 3005. (The full text of this subsection is included as Appendix A of this guidance.) The owners or operators of existing surface impoundments that qualified for interim status when HSWA was enacted on November 8, 1984, were given four years to retrofit these impoundments to meet the Minimum technological Requirements. Section 3005(j)(1) states that an existing surface impoundment shall not:

> . . . receive, store, or treat hazardous waste after the date 4 years after such date of enactment [i.e., November 8, 1988] unless such surface impoundment is in compliance with the requirements of Section 3004(o)(1)(A) which would apply to such impoundment if it were new.

1.1.3 The Affected Community

According to EPA's hazardous waste data base, there were 1,338 impoundments at 981 interim status facilities as of September 10, 1985. All of these impoundments are subject to 3005(j) if they continue to receive, store, or treat hazardous waste after November 8, 1988.

1.1.4 The Availability of Exemptions

The 1984 amendments to RCRA also provide means for the owners or operators of existing surface impoundments to obtain exemptions from or modifications to those requirements. Section 3004(o)(2) provides for an exemption if alternative design and operating practices, together with location characteristics, will prevent the migration of hazardous constituents

into ground or surface water at least as effectively as would the double liner and leachate collection system. In addition, Sections 3005(j)(2), (3), (4), and (13) provide for four different categories of exemptions.

1.2 THE PURPOSE OF THIS MANUAL

This manual is intended to provide guidance both for the owners or operators of surface impoundments who will be applying for exemptions under Section 3005(j) of RCRA and for the Federal and State officials who will be processing these applications.

Throughout this manual, emphasis is placed on the information deemed necessary to document compliance with the exemption requirements. Exemption applications will consist of a report describing all design and operation characteristics, taking into account site-specific factors, that qualify the applicant for the exemption. The applicant's report, in turn, will provide the permit writer with a basis for evaluating the adequacy of the exemption request.

Each of the four categories of exemptions established by Section 3005(j) for existing surface impoundments is discussed in detail in separate sections of this guidance. The four specific exemptions are:

- First exemption (Section 3005(j)(2))
- Second exemption (Section 3005(j)(3))
- Third exemption (Section 3005(j)(4))
- Fourth exemption (Section 3005(j)(13))

1.2.1 Interaction of 3005(j) and Land Disposal Prohibition

Section 3004(d) of RCRA prohibits the land disposal (which includes storage and treatment in surface impoundments) of hazardous wastes specified in 3004(d)(2) after July 8, 1987, unless EPA determines that the prohibition is not necessary to protect human health and environment. Section 3004(e) places similar restrictions on hazardous wastes specified in 3004(e)(2) after

November 8, 1986. In addition, Section 3004(g) requires EPA to review all currently listed hazardous wastes to determine whether the waste may be safely managed by a particular method of land disposal. Section 3004(m) requires that EPA specify treatment levels or methods, if any, that minimize the threat to human health and the environment from wastes prohibited under 3004(d), (e), or (g). If the waste has been treated to the level or by the method specified, the waste or residue is then not subject to the prohibition.

Sections 3005(j)(11)(A) and (B) provide that none of the hazardous wastes prohibited from land disposal under 3004(d),(e), or (g) may be treated in a surface impoundment that does not meet the retrofitting requirements of 3004(o)(1), except under certain circumstances: only if a (nonretrofitted) impoundment qualifies for an exemption to the retrofitting requirement under 3005(j)(2) or (4) may it be used to treat those specified wastes, and then only if no treatment residues that are hazardous are allowed to remain in the impoundment more than one year after entry.

Sections 2 and 4 of this guidance address the exemptions under 3005(j)(2) and (4), respectively. An impoundment that receives one or the other of these exemptions from the retrofitting requirement may therefore be used to treat wastes prohibited from land disposal under 3004(d),(e), or (g), provided the residues are periodically removed as required.

Sections 3 and 5 of this guidance address the exemptions under 3005(j)(3) and (13), respectively. Section 3005(j)(3) pertains to certain wastewater treatment units and (j)(13) pertains to certain impoundments subject to corrective action requirements. These two exemptions are <u>not</u> referenced in 3005(j)(11)(A) or (B). Accordingly, an impoundment that is otherwise exempt from the minimum technological requirements under Section (j)(3) or (13) would be prohibited from treating restricted wastes under Section 3005(j)(11)(B).

1.3 PROCEDURES FOR SUBMITTING AND PROCESSING APPLICATIONS FOR EXEMPTIONS

Owners and operators of interim status and permitted surface impoundments that were in existence on November 8, 1984, and had interim status on that date, may apply for exemptions to 3005(j)(1); they must submit applications to

the EPA Regional Administrator or the Director of the authorized State no later than November 8, 1986. Applications for each exemption should contain the information required for that exemption, as outlined in Sections 2 through 5 of this guidance. The reviewing Agency must then make a final determination on each application within twelve months of the date of receipt of the application or by November 8, 1987, whichever is earlier.

Subsection 3005(e)(2)(B) required all land disposal facilities that had been granted interim status by November 8, 1984, to have certified by November 8, 1985, that the facility was in compliance with all applicable ground water monitoring requirements. Although certification will not in itself qualify an impoundment for an exemption, the lack of this certification would disqualify the impoundment from any of the exemptions inasmuch as failure to certify causes the facility to lose its interim status.

The fourth exemption, found in 3005(j)(13), allows the Administrator to modify the retrofitting requirements if an owner/operator, prior to October 1, 1984, has entered into and is in compliance with a consent order that provides a degree of protection which is at least equivalent to the requirements of 3005(j)(1) (see Section 5 of this guidance). Section (j)(13) does not specifically outline application deadlines or procedural requirements for this exemption. However, EPA believes it is appropriate to require deadlines and procedures for (j)(13), including public notice and comment procedures, equivalent to the other exemptions. Therefore, owner/operators applying for exemptions under (j)(13) must submit applications for the exemptions to the Regional Administrator or State Director by November 8, 1986.

1.3.1 Integration of the Processing of Permits and Exemptions

Section 3005(e)(2) of RCRA requires all interim status land disposal facilities to have applied for a final determination regarding issuance of a RCRA permit by November 8, 1985. Therefore, owners and operators of all surface impoundments subject to 3005(j) that were in existence on November 8, 1985, should have submitted a Part B application by that date. Whenever it is possible, the processing of exemption requests will be completed in

conjunction with the processing of the facility's Part B application. This will expedite the review of exemption applications and will reduce the amount of information applicants must submit.

For those surface impoundments that will be issued permits by November 8, 1986, the permits should contain conditions requiring either a schedule for retrofitting or submission of exemption requests if retrofitting will not occur. Upon determination that the facility is eligible for the exemption, the EPA Regional Administrator or the Director of the authorized State will institute a major modification of that permit in accordance with the procedures outlined in 40 CFR 270.41.

In some cases, it may become apparent that the processing of an applicant's Part B permit application by the EPA Regional Office may fall behind the deadlines mandated by 3005(j). In these instances, the exemption request would receive priority. The processing of the exemption application would proceed separately from the review of the Part B permit application, and the final determination on the exemption would be made by the 1987 deadline.

1.3.2 Determination of the Completeness of the Application

Upon receipt of an exemption request, EPA will perform a review to determine whether a decision regarding the exemption can be made on the merits of the information submitted. As a courtesy to the owner/operator, the determination will normally be completed within 30 days of receipt in order to allow every opportunity for the demonstration to be made that an impoundment qualifies for an exemption. If the application does not contain adequate information to allow the reviewing Agency to determine whether the applicant meets the statutory requirements, additional information will be requested in a letter to the owner/operator. The letter will describe the information needed to complete the application and will request that the data be submitted by a certain date. This date normally will be 30 days from receipt of the letter or November 8, 1986, whichever is earlier.

Due to the requirement that final determinations be made by November 8, 1987, additional information will not normally be requested for applications received after October 8, 1986. In these cases, applications will be considered complete on receipt, and initial determinations will be based on the information in the original exemption application. Because applications that lack adequate information are likely to have difficulty making the required demonstrations, owner/operators who believe they may be eligible for an exemption should submit applications as early as possible so that requests for additional information can be made prior to the 1986 submission deadline.

1.3.3 Public Notice and Opportunity to Comment

Section 3005(j)(5) requires that applications for exemptions 1, 2, and 3 receive public notice and opportunity to comment. Neither 3005(j)(5) nor (j)(13) include requirements regarding public notice and comment for exemption 4; however, EPA will follow the same process for this exemption as for the others. Normally, the public notice process for any of the four exemptions will take place in concert with the public notice of the applicant's draft permit. The process includes 45 days for receipt of written comments. If information submitted during the initial comment period appears to raise substantial new questions, the agency must re-open or extend the comment period. A public hearing may also be held. At the close of the public comment period, the reviewing Agency either prepares and issues a final RCRA permit or denies the permit application. In either case, the applicant and those submitting comments will be notified and given information regarding appeal procedures. In those instances where the exemption application is being processed separately from the Part B application, the full 40 CFR Part 124 public participation procedures would be required for the exemption application.

Because of the short deadlines for decisions under Section 3005(j), some Part 124 procedures, including the provision for administrative review under Section 124.19, may not be appropriate for the exemption decision process. Such an administrative review is time-consuming, and providing for such review would likely delay the Agency's decision past the statutory deadline.

Therefore, if the Region begins processing an exemption request concurrent with the review of the Part B application, and it becomes apparent that the complete Part 124 procedures (including administrative review) cannot be completed by the statutory deadline for exemption decisions, the Region should break the exemption decision out from the permit process and make the final decision separately from the Part B decision.

1.3.4 Final Determinations

Approval or denial of exemption requests may take place through three mechanisms: (1) issuance of the final RCRA permit; (2) written notice from the EPA Regional Administrator or State Director, after appropriate public notice (see Section 1.3.3 above); or (3) a permit modification. An application for an exemption may be denied when an owner/operator does not demonstrate that the facility meets the statutory exemption standards outlined in 3005(j). It is clear that in order to make such a demonstration, an applicant must provide adequate information for the reviewing Agency to make a decision on the exemption, and that relevant facts in the application must be stated correctly. In the event that an application for an exemption is denied, the impoundment must retrofit in accordance with the Minimum Technological Requirements; make a demonstration under 3004(o)(2) that alternative design and operating practices together with location characteristics will prevent migration of hazardous constituents into ground or surface water at least as well as a double liner and leachate collection system; or initiate an approved closure plan. Retrofitting must be completed or receipt of hazardous wastes must cease by November 8, 1988, as required by 3005(j)(1). (See Section 1.4 of this guidance for further discussion of the timing of closure.)

Section 3005(j)(6)(B) requires that surface impoundments that have received exemptions must comply with the requirements of 3005(j)(1) (i.e., retrofit or cease receiving hazardous wastes) if the conditions on which the exemption was based have changed. Compliance with (j)(1) shall be two or three years from the date of discovery, depending on the exemption. All permits, permit modifications, or written notices containing exemption approvals will, therefore, include a provision to this effect.

When a request for an exemption is approved prior to final permit issuance, owner/operators are requested to place the letter from the Agency granting the exemption in the facility's operating record. This will allow the owner/operator to prove that an exemption has been granted.

1.3.5 Exemption Applications for Surface Impoundments that Become Subject to RCRA in the Future

Owners and operators of surface impoundments may also become subject to 3005(j)(1) after November 8, 1984, because of the listing of a new hazardous waste or characteristic under Section 3001. Section 3005(j)(6)(A) requires that the owner or operator must then: (1) submit an exemption request within 2 years of the promulgation date and receive a final determination on that request within 3 years of the promulgation date; or (2) comply with paragraph 1 (i.e., retrofit or cease receiving hazardous wastes) within four years of the promulgation date of the new listing.

It should be noted that, according to Section 3006(g)(1), the classification of a waste as hazardous pursuant to HSWA would take effect at the same time in States with and without authorized RCRA programs. However, if EPA lists a waste that is not required to be listed by HSWA, a State has one year to modify its program (two years if a statutory amendment is required). For these non-HSWA listings, the "promulgation date" for purposes of 3005(j)(6)(A) is the date the State adopts the final rule. Finally, if a State classifies a waste as hazardous, even though it has not been listed in the Federal rules under 3001, State regulations concerning treatment, storage, and disposal of the waste in surface impoundments would be applicable.

1.3.6 Additional Procedural Information

The Agency is in the process of developing an implementation strategy for issues associated with Section 3005(j). This implementation strategy will include options that can be used to resolve anticipated future implementation issues. Some of the implementation issues are administrative in nature (e.g.,

using Part 124 procedures to process exemption requests). Further clarifying guidance concerning administrative issues will be developed through the implementation strategy.

1.4 TIMING OF CLOSURE

Congress did not clearly distinguish between storage and disposal requirements in Section 3005(j). For that reason, EPA believes that no distinction between the two should be made regarding the timing of closure.

Section 3005(j)(1) provides that existing surface impoundments shall not "receive, store, or treat" hazardous waste after November 8, 1988, unless the impoundment is in compliance with the minimum technological requirements of Section 3004(o). EPA construes the statutory language as generally prohibiting the use of existing impoundments for the management of hazardous waste without retrofitting. This interpretation, which construes "storage" as a waste management method involving containment, is supported by the legislative history, which suggests that storage and disposal impoundments should be treated the same under 3005(j)(1). In a colloquy on the amendment from which the statutory language was derived, Senators Randolph and Chafee clarified the intent of the provision not to require retrofitting for impoundments that receive or store hazardous waste prior to November 8, 1988, as long as hazardous waste is not received after that date (130 Cong. Rec. S9182 (daily ed., July 25, 1984)). The conference report also supports this reading: Congress, in choosing the language now in the statute, rejected broader House language that would have required retrofitting for impoundments in which hazardous waste was "placed or maintained" after the effective date (H.R. Rep. No. 1133, 98th Cong., 2d Sess. 96 (1984), emphasis added)).

The Agency considered whether the limitation on "storage" of hazardous waste in Section 3005(j)(1) should be read to require that all impoundments that do not retrofit have completed closure by November 8, 1988, so that they cannot be said to be "storing" any waste. However, neither the statutory language nor the legislative history refers to the technical requirements of closure. Rather, Congress appeared to be concerned with the broader problem

of identifying the impoundments that should be retrofitted because they continue to actively manage hazardous waste. In fact, the legislative history cited above expressly allows for the possibility that an impoundment that stopped receiving hazardous waste could continue to manage nonhazardous waste without being subject to Section 3005(j)(1) (130 Cong. Rec. S9183 (daily ed., July 25, 1984)).

Finally, EPA considered whether the limitation on "storage" of hazardous waste in Section 3005(j)(1) should be read to refer to EPA's regulatory distinction between storage impoundments (i.e., those that remove wastes at closure) and disposal impoundments (i.e., those that close with wastes in place). It was considered whether storage impoundments that do not retrofit would have to complete closure (i.e., remove all wastes such that no wastes are being stored) by November 8, 1988. Because "disposal" is not specifically prohibited by Section 3005(j)(1), disposal impoundments could continue to dispose of hazardous waste without retrofitting. This interpretation would distinguish between impoundments based on the contents of their closure plans. Nothing in the legislative history suggests that Congress considered such a distinction to be justified on environmental grounds for purposes of Section 3005(j)(1).

Thus, by November 8, 1988, all surface impoundments will have to retrofit, receive an exemption under 3004(o)(2), receive an exemption under 3005(j), or stop receiving hazardous wastes. Current closure regulations under 40 CFR 264.112 and 265.112 require owner/operators to begin closure within 30 days after the last date on which wastes are received.

Current closure regulations also require owner/operators to notify the Regional Administrator at least 180 days prior to the date on which closure is expected to begin. Amendments to the closure regulations promulgated on May 2, 1986 (51 FR 16422), effective October 29, 1986, would require notification at least 60 days prior to the date closure is expected to begin for permitted facilities and interim status facilities with approved closure plans. The new regulations clarify that the expected date of closure must be no later than 30 days after the unit has received the last known final volume

of hazardous wastes (40 CFR 264.112(d)(2), 265.112(d)(2)). Closure must be completed within 180 days of the final receipt of hazardous waste (40 CFR 264.13, 265.13). Thus, although Section 3005(j)(1) does not in itself require closure of impoundments that have stopped receiving hazardous wastes, EPA has concluded that the expeditious closure of impoundments that no longer receive hazardous waste will significantly improve protection of human health and the environment (51 FR 16445).

SECTION 2

FIRST EXEMPTION

2.1 STATUTORY PROVISIONS

According to Section 3005(j)(2) of RCRA, in order to qualify for this exemption, an interim status surface impoundment must:

- Have at least one liner for which there is no evidence that such liner is leaking,
- Be located more than one-quarter mile from an underground source of drinking water, and
- Be in compliance with generally applicable ground water monitoring requirements for facilities with permits under subsection (c) of Section 3005.

2.2 GUIDANCE FOR THE FIRST EXEMPTION

Section 3005(j)(5)(D)(i) requires the applicant to provide certification that the liner is designed, constructed, and operated in accordance with applicable requirements, that the surface impoundment is more than one-quarter mile from an underground source of drinking water, and that there is no evidence that the liner is leaking. The certification must be made by a registered professional engineer with academic training and experience in ground water hydrology. The owner/operator must include in the exemption application evidence of the engineer's training and experience.

The number of surface impoundments eligible for this exemption is expected to be limited by the requirement of being located more than one-quarter mile from a USDW. It has been estimated that 95 percent of all currently operated surface impoundments are located within one-quarter mile of a USDW (129 Cong. Rec. H8195 (daily ed., October 6, 1983)). For that reason, EPA believes that this may be the most difficult demonstration to make; it may be advisable for prospective applicants to examine this issue before any others when considering their possible eligibility for the first exemption.

2.2.1 Demonstrate that the Liner is Adequately Designed, Constructed, Installed, and Operated

As provided in Section 3005(j)(2), a surface impoundment must have at least one liner to qualify for the first exemption. Congress defined the term "liner" in Section 3005(j)(12)(A) as:

- "A liner designed, constructed, installed, and operated to prevent hazardous waste from passing into the liner at any time during the active life of the facility"; or
- "A liner designed, constructed, installed, and operated to prevent hazardous waste from migrating beyond the liner to adjacent subsurface soil, ground water, or surface water at any time during the active life of the facility."

In general, only facilities with "installed" liners will be eligible for this exemption; no "in situ" liners will be considered. This reasoning is based on the statutory language quoted above and on the legislative history of Section 3005(j)(12)(A). Literal interpretation of (j)(12)(A) would preclude naturally existing soil liners because such liners are neither installed nor constructed.

Section 3005(j)(5)(D)(i) requires certification that the liner of the surface impoundment is designed, constructed, and operated in accordance with applicable requirements. This certification must be made by a registered professional engineer with academic training and experience in ground water hydrology. The applicant must provide evidence of the engineer's training and experience. The certification and supporting documentation must be included in the application for the exemption.

With regard to the meaning of the phrase "applicable requirements" in 3005(j)(5)(D)(i), the following statement made by Representative Forsythe (129 Cong. Rec. H8142 (daily ed. October 6, 1983)) is helpful:

> . . . when making the determination regarding the exception of a particular unit, EPA will apply similar standards to those they now use in determining compliance with the requirements of 40 CFR Subpart K as currently in effect.

The legislative history shows that Congress intended that installed liners be able to meet the performance standards for new units set forth in 40 CFR Part 264 Subpart K prior to enactment of the RCRA Amendments of 1984. Other EPA guidance identifies specifications for liner designs that will comply with the standards set forth in Part 264 (EPA, 1982a; EPA, 1984b). However, if a surface impoundment does not comply with the design conditions outlined in EPA's guidance but can demonstrate that the existing liner meets the performance standards of Subpart K, it also will be eligible for this exemption.

Design and operating requirements in 40 CFR 264.221(a) make a significant distinction between liner requirements for disposal impoundments and for storage impoundments. Liners in place at storage units must prevent wastes from passing through the liner, while those at disposal units must prevent wastes from passing into the liner. EPA guidance interprets this requirement to mean that disposal impoundments must be equipped with a synthetic liner. For storage impoundments, EPA guidance interprets the requirement to mean that recompacted clay liners may be used as an alternative to synthetic liners. These clay liners must be sufficiently thick to prevent waste from migrating through the liner during the active life of the unit. Section 3005(j)(9) requires that at the time of closure of storage impoundments (i.e., those whose liners meet the requirements of Section 3005(j)(12)(A)), all wastes, contaminated liner material, and contaminated soil be decontaminated or removed.

Applications for the first exemption that are based, in part, on having an acceptable clay liner must provide adequate documentation of liner thickness. The Draft RCRA Guidance Document on surface impoundments recommends using the "transit time equation" to determine the necessary liner thickness (EPA, 1982a). However, it is now believed that this equation tends to underestimate the required liner thickness. Although further development and documentation of the techniques are required, numerical simulation techniques provided in EPA (1984a) are currently recommended as a more accurate modeling technique.

EPA expects requests for the first exemption to be accompanied by compatibility testing reports for both clay and synthetic liners. If compatibility test data are not complete or not available, manufacturers' data alone will not provide adequate information for demonstrating compatibility. It should be noted that this exemption does not require any new information; rather, all the requirements have been addressed in the existing EPA guidance documents cited below. The guidances cited were developed to implement the July, 1982, 40 CFR Part 264 rules.

If compatibility test data are not complete, readers are referred to EPA Method 9090, contained in EPA's 1982 Draft Guidance on surface impoundments (EPA, 1982a) and in Test Methods for Evaluating Solid Wastes (EPA, 1982b). The Permit Writers' Guidance Manual (EPA, 1983) and the Permit Applicants' Guidance Manual (EPA, 1984b) also contain detailed discussions of synthetic liner-testing guidance. Readers are also referred to EPA Method 9100, contained in EPA's 1982 Draft Guidance on surface impoundments (EPA, 1982a) and in Test Methods for Evaluating Solid Wastes (EPA, 1982b). Soil Properties, Classification, and Hydraulic Conductivity (SW-925) is also available for guidance on compatibility testing for clay liners. Equivalent data from testing conducted for facilities with a similar design and similar range of wastes may be adequate. In addition to thickness, strength, and compatibility test information, the owner/operator should identify quality assurance/quality control procedures used during liner installation and/or construction and provide evidence that the completed liner meets the design requirements.

2.2.2 Demonstrate that the Liner Is Not Leaking

As provided in Section 3005(j)(2), an application for the first exemption must demonstrate that there is no evidence that the liner of the surface impoundment is leaking. As required under Section 3005(j)(5)(C), an owner or operator must provide all reasonably ascertainable evidence as to whether the surface impoundment is leaking. Finally, Section 3005(j)(5)(D) requires that the owner or operator must provide certification by a professional engineer

that there is no evidence that the liner is leaking. The engineer must have academic training and experience in ground water hydrology and applicants should provide evidence of this training and experience.

"Leaking" is defined as a statistically significant increase over background concentrations (as defined in 40 CFR Part 264 Subpart F) that is attributable to the surface impoundment. Other evidence of leaking, such as visible leaks or sudden drops in liquid levels of the impoundment, also would be sufficient. These definitions of "leaking" were adopted by the House-Senate committee of conference (130 Cong. Rec. H11131 (daily ed., October 3, 1984)).

In meeting this requirement, all relevant data available, including that collected for both hazardous and nonhazardous constituents, should be provided. Although EPA will not require collection of any data not already required under RCRA regulations, EPA will consider any additional data provided by the owner/operator.

The first source of reasonably ascertainable evidence of leakage would be interim status ground water monitoring data for facilities with 40 CFR Part 265 monitoring systems or, for facilities that have received a Part B permit, monitoring data collected under 40 CFR Part 264. The primary objective of the Part 265 Subpart F ground water monitoring requirements is to identify the existence and magnitude of ground water impacts from hazardous waste land disposal facilities. As noted in the preamble to Part 264, monitoring that is conducted "in accord with Part 265 interim status requirements" should provide "a reliable base of information that can be used to determine whether hazardous constituents have entered the ground water." Comprehensive instructions on conducting ground water monitoring in accordance with Subpart F of Part 265 are provided in EPA publication SW-963 (EPA, 1983). Applicants and permit writers should be familiar with the specific requirements addressed in that document. Permit writers should also be familiar with the draft Ground-Water Monitoring Technical Enforcement Guidance Document, which discusses compliance with 40 CFR Part 265 Subpart F

(EPA, 1985). If a facility was exempt from Part 265 Subpart F ground water monitoring requirements, the 265 waiver must be found to have been valid in order to qualify for this retrofitting exemption.

Interim status facilities will also have submitted applications for Part B permits. Data provided in these applications will be examined by EPA in determining the possibility of leakage. Except as provided in 40 CFR 264.90(b), facilities will have submitted a summary of interim status ground water monitoring data under 270.14(c)(1). Certain facilities will also have submitted information under 270.14(c)(4) in their Part B applications. The information required by (c)(4) includes a description of any plume of contamination that has entered the ground water from the surface impoundment; a summary of monitoring data obtained during the interim status period; and a description of aquifers underneath the facility. Three categories of facilities must have submitted this information: facilities that should have interim status monitoring but do not (e.g., a facility that wrongly claimed a Part 265 ground water monitoring waiver); facilities whose interim status data indicate contamination has occurred; and facilities whose Part 265 monitoring system was inadequate to determine whether a plume of contamination exists. EPA believes that information submitted in the Part B application under 40 CFR 270.14(c) should be of adequate quantity and quality to qualify the facility for a permit; if it is not, the facility will not be eligible for this exemption.

It should be noted that Part 265 monitoring data or data submitted under 270.14(c) from a multiple unit facility may not be sufficient to demonstrate "full compliance" and "no leakage" from the particular unit under consideration for the first exemption. Ground water monitoring data that indicates no contamination in downgradient wells will be acceptable, provided that a downgradient hydrogeologic report indicates that such wells would intercept any leakage from the unit for which an exemption is sought. Where contamination is indicated in certain downgradient wells, the application must include data that clearly demonstrate that the unit for which an exemption is sought is not responsible for the contamination. Without conducting

additional sampling, and perhaps installing additional wells, such an indication would be difficult to demonstrate.

Ground water monitoring data should be augmented by documentation that there are no visible signs of leaks (such as stressed vegetation) and no history of sudden drops in liquid level or overtopping (see general inspection regulations in 40 CFR 264.226(a), (b), and (c), and in 265.226(a)). Additional information would include site inspection reports, including dike certification (i.e., no history of leakage through dike), data from periodic waste removal at storage units, and leak detection system monitoring data, if available. At a minimum, it is generally recommended that applicants submit data for at least the preceding 12 months. However, it should be noted that permit writers may review data submitted for previous periods.

An owner/operator may also submit unsaturated zone monitoring data, although this is not required. Permit writers may find this information valuable in determining leakage.

In regard to leakage, Section 3005(j)(7)(B) also requires the Agency to consider the likelihood of migration from the unit. Section 3005(j)(7)B) should also be considered in the evaluation of requests for the first exemption. See Section 3.3.1 of this guidance for further discussion of Section 3005(j)(7)B).

2.2.3 Demonstrate Impoundment Location Relative to Underground Source of Drinking Water

To qualify for the first exemption, applicants must also demonstrate compliance with Section 3005(j)(2)(B), which requires that the surface impoundment be located at least one-quarter mile from any underground source of drinking water (USDW). EPA interprets the one-quarter mile provision to include the subsurface hemisphere encompassed by a one-quarter mile radius from the regulated unit (see Figure 1). The number of surface impoundments eligible for the first exemption is expected to be limited by this requirement. As noted, it has been estimated that 95 percent of all existing

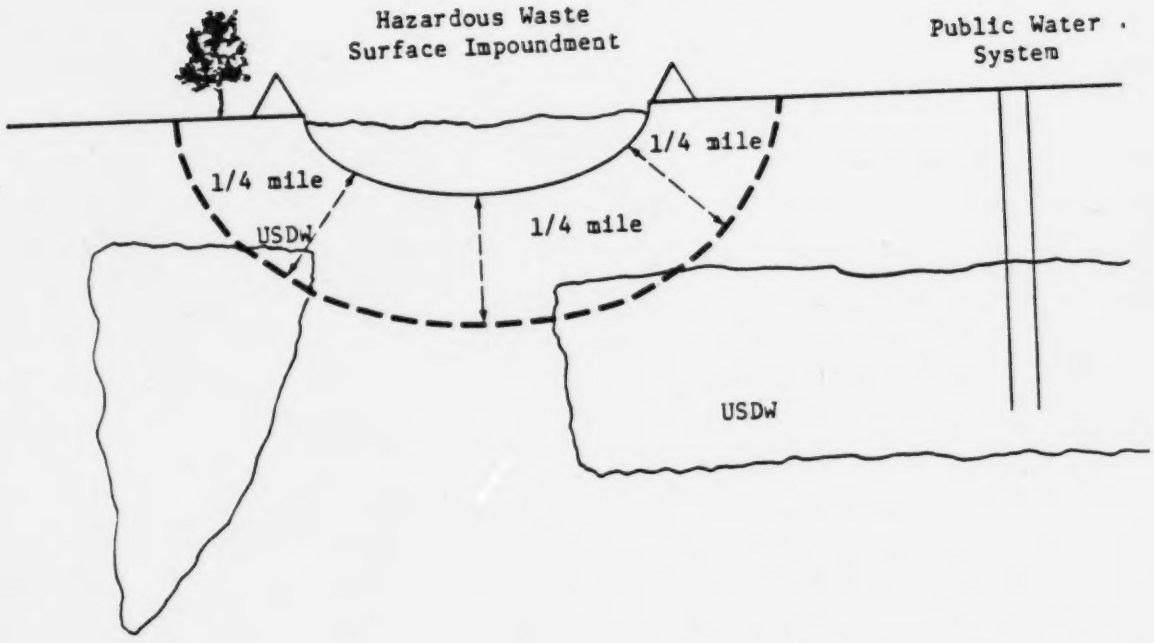


Figure 1. Examples of underground sources of drinking water within one-quarter mile of a hazardous waste surface impoundment. (Note that USDW does not have to be currently supplying water and that any portion of a nonexempted USDW within a 1/4-mile radius disqualifies an impoundment from the first exemption.)

surface impoundments are located within one-quarter mile of a USDW (129 Cong. Rec. H8195 (daily ed., October 6, 1983)). For that reason, EPA believes that this may be the most difficult demonstration to make; it may be prudent for prospective applicants to examine this issue before any others when considering their possible eligibility for the first exemption.

Section 3005(j)(12)(C) states that the term "underground source of drinking water" has the same meaning as provided in the Safe Drinking Water Act (SDWA) regulations. USDW's generally encompass Class I and II ground-waters under the classification guidelines of EPA's Ground Water Protection Strategy. SDWA regulations (40 CFR 144.3) state that a USDW is an aquifer or its portion:

(a)(1) Which supplies any public water system; or

(2) Which contains a sufficient quantity of ground water to supply a public water system; and

(i) Currently supplies drinking water for human consumption; or

(ii) Contains fewer than 10,000 mg/L TDS; and

(b) Which is not an exempted aquifer.

It should be noted that as used in these regulations, "aquifer" refers to an entire hydrogeologic unit, not only the points at which water is or could be withdrawn. "Public water system" is defined in 40 CFR 142.2(k) as "a system for provision to the public of piped water for human consumption, if such system has at least 15 service connections or regularly serves an average of at least 25 individuals daily at least 60 days out of the year." Per capita water use varies greatly depending on geographical and seasonal consumption, so the water volume necessary to qualify as a potential public water system could be relatively small in some circumstances.

To qualify as a USDW, an aquifer need not be actively supplying public water. Under 40 CFR 144.3, as noted above, the aquifer need only have a sufficient capacity to supply a public water system, have less than 10,000 milligrams per liter (mg/L) total dissolved solids, and not be an exempted aquifer (exemption criteria are provided in 40 CFR 146.4). To illustrate the

restrictiveness of the 10,000 mg/L dissolved solids limitation, ground water having a total dissolved solids concentration greater than 500 mg/L is not recommended for human consumption and any ground water having more than 2,000 mg/L is generally unfit for long-term irrigation (Clark, 1977). If there is any question whether the concentration of dissolved solids could disqualify an aquifer from being classified as a USDW, the concentration of solids upgradient of the facility should be used to make the determination.

The most complete sources of information concerning identified USDW's are the State offices with jurisdiction over underground injection wells. State offices dealing with drinking water may also be valuable sources of information. Appendix B contains a list of EPA and State officials who may be helpful in identifying USDW's.

2.2.4 Demonstrate Compliance with Generally Applicable Ground Water Monitoring Programs

Finally, an applicant must demonstrate compliance with applicable (40 CFR Part 264) ground water monitoring requirements in order to be eligible for the first exemption. Specifically, Section 3005(j)(2)(C) requires compliance with generally applicable ground water monitoring requirements for facilities with permits under 3005(c).

The stage in the permitting which a facility is in will influence EPA's approach to assessing compliance with Part 264 ground water monitoring (GWM) requirements. If a facility has been issued a Part B permit, the facility must be in compliance with all permit conditions pertaining to ground water protection. If no final Part B permit has been issued, all information submitted under Part 265 Subpart F and 270.14(c) must be of adequate quantity and quality to qualify the facility for a permit. This would demonstrate the ability to establish whichever Part 264 ground water protection program is appropriate to the facility (i.e., detection monitoring, compliance monitoring, or correction action program).

It should be noted that if a permitted facility has a compliance monitoring or corrective action program, or if an interim status facility has (or should have) submitted plans to establish a compliance monitoring or corrective action program under 270.14(c), the exemption application must include data that clearly demonstrate that the unit for which the exemption is sought is not responsible for the contamination (see Section 2.2.2 of this guidance).

2.3 CHANGES IN CONDITION CAUSING THE FIRST EXEMPTION TO BE REVOKED

In providing exemptions from surface impoundment retrofitting requirements, Congress has made a provision for situations in which a change in condition, including a leak, develops after an exemption has been granted. As stated in Section 3005(j)(6)(B), exempted surface impoundments that develop leaks are subject to the following:

> In any case in which a surface impoundment is initially determined to be excluded from the requirements of paragraph (1) but due to a change in condition (including the existence of a leak) no longer satisfies the provisions of paragraph (2), (3), or (4) and therefore becomes subject to paragraph (1), the period for compliance in paragraph (1) shall be 2 years after the date of discovery of such change of condition, or in the case of a surface impoundment excluded under paragraph (3) 3 years after such date of discovery.

In the above citation, paragraph (1) refers to the retrofit requirements while paragraphs (2), (3), and (4) refer to the first, second, and third exemptions, respectively. Thus, an impoundment that initially qualifies for the first exemption but for which a change in condition occurs would have 2 years after the change in condition is discovered in which to retrofit or to cease receiving hazardous wastes (see Section 1.4 of this guidance for information concerning the timing of closure).

The changes in condition that would make an exempted impoundment no longer eligible for the first exemption include the following:

- There is a visible leak or visible evidence of a leak;
- There is a sudden, unexplained drop in liquid level at the unit;

- New information becomes available (e.g., on the location of a USDW);
- The facility goes into compliance or corrective action monitoring, unless the owner/operator demonstrates that the exempted unit is in compliance (i.e., the exempted impoundment is not leaking);
- A leak is discovered through the ground water monitoring program under 40 CFR Part 264, in which case the time of discovery is the time that analysis confirms that constituents have entered the ground water.
- The impoundment no longer complies with ground water monitoring requirements.

SECTION 3

SECOND EXEMPTION

3.1 STATUTORY PROVISIONS

A second exemption from the requirements of Section 3005(j)(1) of RCRA is provided by 3005(j)(3). In order to quality for this exemption, a surface impoundment must be one which:

> (A) contains treated waste water during the secondary or subsequent phases of an aggressive biological treatment facility subject to a permit issued under section 402 of the Clean Water Act (or which holds such treated waste water after treatment and prior to discharge);
>
> (B) is in compliance with generally applicable ground water monitoring requirements for facilities with permits under subsection (c) of this section; and
>
> (C)(i) is part of a facility in compliance with section 301(b)(2) of the Clean Water Act, or
>
> (ii) in the case of a facility for which no effluent guidelines required under section 304(b)(2) of the Clean Water Act are in effect and no permit under section 402(a)(1) of such Act implementing section 301(b)(2) of such Act has been issued, is part of a facility in compliance with a permit under section 402 of such Act, which is achieving significant degradation of toxic pollutants and hazardous constituents contained in the untreated waste stream and which has identified those toxic pollutants and hazardous constituents in the untreated waste stream to the appropriate permitting authority.

Section 3005(j)(5)(D)(ii) requires the owner/operator applying for this exemption to provide certification that the impoundment meets the conditions of the exemption, based on analysis of toxic pollutants and hazardous constituents that are likely to be present in the untreated waste stream. This certification must be made by a registered professional engineer with academic training and experience in ground water hydrology. The owner/operator should include in the application evidence of the engineer's training and experience.

3.2 GUIDANCE FOR 3005(j)(3)(A)

The intent of Section 3005(j)(3)(A) is to allow surface impoundments that contain treated waste water during secondary or subsequent phases of an "aggressive biological treatment facility" to qualify for the exemption (provided the demonstrations required under 3005(j)(3)(B) and (C) are also made). The facility must be subject to a permit issued under the National Pollutant Discharge Elimination System (NPDES). Because facilities that discharge to publicly owned treatment works do not have NPDES permits, they are not eligible for this exemption.

3.2.1 Aggressive Biological Treatment Facility

Section 3005(j)(12)(B) provides the definition of "aggressive biological treatment facility:"

(12)(B)For the purposes of this subsection, the term aggressive biological treatment facility means a system of surface impoundments in which the initial impoundment of the secondary treatment segment of the facility utilizes intense mechanical aeration to enhance biological activity to degrade waste water pollutants and

(i) the hydraulic retention time in such initial impoundment is no longer that 5 days under normal operating conditions, on an annual average basis;

(ii) the hydraulic retention time in such initial impoundment is no longer than thirty days under normal operating conditions, on an annual average basis: PROVIDED, That the sludge in such impoundment does not constitute a hazardous waste as identified by the extraction procedure toxicity characteristic in effect on the date of enactment of the Hazardous and Solid Waste Amendments of 1984; or

(iii) such system utilizes activated sludge treatment in the first portion of secondary treatment.

To qualify for an exemption under this section, the applicant must first demonstrate that the initial impoundment for which the exemption is sought is a component of a secondary treatment system. The primary purpose of the secondary treatment system must be to provide intensive mechanical aeration that assists in meeting the requirements of an NPDES

permit. EPA intends to make the determination of whether an impoundment is part of such a secondary treatment system on a case-by-case basis, based on the following factors:

- Evidence that the intense mechanical aeration in the impoundment contributes to NPDES compliance;
- Operating data that demonstrates sufficient biological activity to degrade pollutants (e.g., NPDES permit parameters such as biological oxygen demand and dissolved oxygen in the influent versus effluent; there should be evidence that aerobic bacteria are active in the unit);
- Evidence that the mechanical aeration equipment is of an adequate size to prevent settling of solids as well as providing oxygen (except for trickling filters and rotating biological contactors);
- Other engineering and design characteristics of the impoundment, including the relative ages of the impoundment and aeration equipment.

For impoundments with NPDES permits, the exemption would cover only the secondary treatment units and subsequent treatment units or holding ponds that contain treated water. It would not apply to any preliminary treatment units that may exist, such as flow equalization basins or primary sedimentation units. Any treatment facility for which the exemption applies must be one which uses "aggressive biological treatment."

In some industrial situations, waste water may not undergo primary treatment prior to undergoing secondary treatment. Section 3005(j)(3) specifies that the exemption is available to an impoundment that "contains treated waste water." In view of the language and legislative history (see Cong. Rec. S9183 (daily ed., July 25, 1984)) of 3005(j)(12)(B), EPA does not interpret this phrase to mean that the waste stream must have undergone some prior treatment before reaching the impoundment in question; it is not necessary that an impoundment receive treated waste water, only that it contain treated waste water.

3.2.1.1 Description of Secondary Treatment Systems

Secondary treatment is a term that means a level of treatment applied to a waste stream to achieve a reduction in pollutants (usually BOD and suspended solids) greater than that achieved by primary treatment. Because some form of an activated sludge process generally is used to achieve this level of treatment, activated sludge treatment and secondary treatment have become synonymous. Other types of secondary treatment include trickling filters, bio-discs (rotating biological contactors--RBC's), and certain waste stabilization ponds.

The fate of organic materials in secondary treatment systems includes biodegradation, volatilization to the air, incorporation in the solids, or passage through in the effluent. Heavy metals have only two fates--incorporation into the sludge or passage through in the effluent. Volatilization is a major removal mechanism for many of the organic toxic pollutants.

3.2.1.1.1 Activated Sludge Systems

An activated sludge system is a secondary treatment system that produces and maintains an active mass of micro-organisms that are capable of aerobically reducing the organic matter in a waste stream. Bacteria use the organic content in the untreated waste water as food, thus producing more bacteria. These waste streams generally have continuous flow and include two separate units--an aeration tank and a secondary settler. Waste water is combined with the activated mass and mixed, or suspended, in the aeration tank for 4 to 6 hours with a mechanically produced external supply of air to provide mixing and to supply oxygen for the bacteria (detention times may be longer, 4 to 6 days, during aeration modification of activated sludge). The mixture then passes to the secondary settler (detention time, 2 to 4 hours) where the active biomass is removed by settling. To maintain an equilibrium of biomass in the system, solids (waste sludge) must be removed in proportion to the new mass being formed. A portion of the settled solids is then returned

to the aeration tank to maintain an active biomass and increase the rate of reduction of the organic matter. Because of the short detention times, the need for oxygen and mixing, and recycling requirements, activated sludge systems often use tanks (usually concrete).

3.2.1.1.2 Fixed Film Systems

Trickling filters and RBC's are also secondary treatment systems; they are referred to as "fixed film" systems. Like activated sludge systems, these units use mechanical energy to increase or intensify the rate of biological activity. Whereas activated sludge and waste stabilization ponds rely on the biomass to be suspended in water, fixed film units operate with the biomass attached to plastic or rock media as a biological slime.

In the case of trickling filters, waste water is mechanically distributed over the top of the stationary media. As the liquid passes down through the deep media, the organic materials in the waste water are consumed by the attached biomass. The units are open at the bottom to allow air to pass up through the media and supply oxygen to the bacteria. A secondary settler is used to capture the biomass, which "sloughs off" the media. To increase the efficiency of these units, effluent is recycled to the top of the trickling filter. Solids from the secondary settler are not recycled but are removed for disposal.

In RBC's, the biomass is attached to a series of large plastic discs that are mechanically rotated slowly through the waste water. The water level is located just below the centerline of the discs to provide for sufficient oxygen transfer. The remainder of the operation is similar to that of a trickling filter. Trickling filters and RBC's generally produce an effluent of slightly lower quality than an activated sludge system in the same amount of contact time. Like activated sludge, trickling filters and RBC's use tanks.

3.2.1.1.3 Waste Stablization Ponds

Stabilization ponds are another type of secondary treatment. Because of their large size, waste stabilization ponds normally are constructed using earthen bottoms. A waste stabilization system normally consists of 3 or more separate ponds or cells, which are operated in series.

For purposes of this discussion, waste stabilization ponds have been divided into two categories: those with and those without mechanical aeration. The most common type of nonaerated ponds are called "facultative" lagoons, which use both algae and bacteria for the reduction of organic matter. In some cases, mechanical stirring is employed to mix the liquid but not to supply dissolved oxygen. In facultative systems, oxygen is supplied by the algae. Detention times in facultative ponds generally ranges from 10 to 30 days.

Aerated ponds, such as oxidation ditches, rely only on the aerobic bacteria to reduce organic matter. Mechanical aeration is supplied for mixing as well as to provide dissolved oxygen for the bacteria. Normally only the first cell of an aerated pond system uses mechanical aeration. Solids produced in the first cell are carried in the effluent to the second cell, where they are settled.

This process is essentially the same as an activated sludge process, with one major exception: the process does not include the recycling of an active mass of micro-organisms from the second cell to the aerated cell. As a result, the detention time to provide a similar level of treatment ranges from 3 to 10 days, compared to 4 to 6 hours for an activated sludge system. The second cell and all subsequent cells of an aerated pond system function as facultative lagoons inasmuch as the decrease of the organic matter continues.

3.2.1.2 Secondary Treatment Systems that Qualify as Aggressive Biological Treatment Facilities

Section 3005(j)(12)(B) defines "aggressive biological treatment" as, inter alia, a facility using "intense mechanical aeration to enhance biological activity." EPA believes that the use of the word "intense" was intended to imply the primary purpose of the aeration equipment (to promote biological activity) and, as such, can be associated with the "rate" of biological activity. Like activated sludge, trickling filters and RBC's are a form of secondary treatment that are designed to promote aerobic biological activity to reduce pollutants. In all three systems, mechanical energy is used to provide aeration to enhance the biological activity; in addition, raw waste water is in contact with the active biomass for similar amounts of time and similar effluent qualities are attained. Thus, trickling filters and RBC systems, like activated sludge systems, may be characterized as providing "intense mechanical aeration." However, permit writers should ensure that systems described as "activated sludge systems" do indeed return a portion of the solids to the aeration tank.

A number of other types of surface impoundments could also be eligible for this exemption, such as aerated ponds, detention ponds, holding ponds, or polishing ponds following secondary treatment. As noted, both facultative and aerated ponds are included under the broad definition of secondary treatment, but only aerated ponds use "intense mechanical aeration to enhance biological activity." Because facultative ponds do not use intense mechanical aeration, they are not eligible for the exemption.

Section 3005(j)(12)(B)(i) limits the detention time in the aerated cell to an annual average of 5 days under normal operating conditions. Section 12(B)(ii) allows the detention time to be as high as 30 days if the sludge is not a hazardous waste as determined by the extraction procedure. Because of the structure of (12)(B), provisions (i), (ii), and (iii) are read as being mutually exclusive alternatives. Read together, therefore, Sections 12(B)(i) and (ii) would not require the sludge in an aerated cell with a annual average detention time of 5 days or less to meet the extraction procedure toxicity test, whereas if detention time is greater than 5 and less than or equal to

30 days an extraction procedure toxicity test on the sludge is required. Although it is unlikely that the detention time in the aerated cell of an aerated pond would exceed 30 days, the exemption could not be obtained if the annual average detention time under normal operating conditions is 31 days or more. Section 12(B)(iii) explicitly includes systems that utilize activated sludge treatment in the first portion of secondary treatment in the definition of "aggressive biological treatment." Because 12(B)(i), (ii), and (iii) are read as being mutually exclusive, therefore, the requirements related to retention time in (i) and (ii) would not apply to activated sludge systems.

Holding ponds or polishing ponds that receive effluents from secondary treatment systems (activated sludge, trickling filters, and RBC's) are defined as tertiary treatment, but rarely use "intense mechanical aeration" in the ponds themselves to promote biological activity. Their major function is to provide additional settling of the suspended solids and, in some cases, nitrogen removal, but not "aggressive biological treatment," which was already provided in the secondary treatment facility.

Congressional intent was that "... surface impoundments that contain treated waste water during or <u>after</u> the secondary or tertiary phase of an aggressive biological treatment facility" would be eligible for the exemption (130 Cong. Rec. S9182 (daily ed., July 25, 1984) (emphasis added)). EPA does not read the words "initial surface impoundment" in 3005(j)(12)(B) so as to thwart the congressional intent to include surface impoundments that receive waste water after it has undergone intense mechanical aeration. Therefore, tertiary surface impoundments (e.g., surface impoundments that receive treated waste water after secondary treatment) would be eligible for the exemption as long as "aggressive biological treatment" occurred in a prior unit.

Consistent with this interpretation of congressional intent, ponds following trickling filters and RBC's could be eligible for the exemption, as well as those following activated sludge units. However, ponds that receive sludge (e.g., for drying, storage, or disposal of the sludge), as opposed to

the treated waste water, are not eligible for the exemption; Section 3005(j)(3)(A) specifically requires that the surface impoundment contain treated waste water.

In summary, any surface impoundment that contains treated waste water during or following secondary treatment that is characterized by intense mechanical aeration may be eligible for this exemption. The intense mechanical aeration can occur in the initial surface impoundment for which an exemption is sought or in a tank prior to reaching the initial surface impoundment. The following types of secondary treatment normally would be considered as aggressive biological treatment facilities:

- Activated sludge systems;
- Trickling filter or RBC's;
- Aerated ponds.

As noted, EPA will make the determination of whether an impoundment or impoundments is/are qualified for the exemption on a case-by-case basis. It should be determined that the primary purpose of intense mechanical aeration is to contribute to NPDES compliance; that there is sufficient biological activity to degrade pollutants; that mechanical activity is sufficient to prevent the settling of solids, except as provided by Section 3005(j)(12(B)(ii); and that other engineering and design characteristics of the initial impoundment for which the exemption is sought are consistent with the primary purpose.

3.2.2 Change in Condition

Surface impoundments would no longer be eligible for the second exemption if they no longer met the requirements of 3005(j)(3)(A). Changes in conditions that could cause revocation of the exemption would include, but are not limited to, a change to a waste water treatment system that used means of degradation other than mechanical aeration; a change in the purpose of the impoundment (e.g., from storing treated waste water to receiving sludge); or a change in aeration efficiency that caused a change in the characteristics of the sludge for purposes of 3005(j)(12)(B)(ii).

3.3 GUIDANCE FOR 3005(j)(3)(B)

To be eligible for the second exemption, an applicant must also demonstrate compliance with applicable 40 CFR Part 264 Subpart F ground water monitoring requirements. This demonstration is the same as that required for the first exemption; it is discussed in Section 2.2.4 of this guidance. Readers are referred to that section for EPA guidance regarding ground water monitoring requirements for this exemption. As noted below, however, impoundments that are found to be leaking will not automatically be disqualified from receiving this exemption. Thus, applicants who have received permits should be in compliance with all ground water monitoring requirements of the permit. Other applicants should have submitted applications for Part B permits; these applications should be adequate to qualify the facility for a permit.

3.3.1 Evidence Regarding Leakage

As required under Section 3005(j)(5)(C), an owner or operator must provide all reasonably ascertainable evidence as to whether the surface impoundment is leaking. "Leaking" is defined as a statistically significant increase over background concentrations (as defined in 40 CFR Part 264 Subpart F) that is attributable to the surface impoundment. Other evidence of leaking, such as visible leaks or sudden drops in liquid levels of the impoundment, also would be sufficient. These definitions of "leaking" were adopted by the House-Senate committee of conference (130 Cong. Rec. H11131 (daily ed., October 3, 1984)).

In meeting this requirement, all relevant data available, including that collected for both hazardous and nonhazardous constituents, should be provided. Although EPA will not require collection of any data not already required under RCRA regulations, EPA will consider any additional data provided by the owner/operator.

The first source of reasonably ascertainable evidence of leakage would be interim status monitoring data for facilities with 40 CFR Part 265 monitoring systems, or monitoring data collected under 40 CFR Part 264 for facilities

that have received a Part B permit. The primary objective of the Part 265 Subpart F ground water monitoring requirements is to identify the existence and magnitude of ground water impacts from hazardous waste land disposal facilities. As noted in the preamble to Part 264, monitoring that is conducted "in accord with Part 265 interim status requirements" should provide "a reliable base of information that can be used to determine whether hazardous constituents have entered the ground water." Comprehensive instructions on conducting ground water monitoring in accordance with Subpart F of Part 265 are provided in EPA publication SW-963 (EPA, 1983). Applicants and permit writers should be familiar with the specific requirements addressed in that document. Permit writers should also be familiar with the draft Ground-Water Monitoring Technical Enforcement Guidance Document, which discussed compliance with 40 CFR Part 265 Subpart F (EPA, 1985).

Interim status facilities will also have submitted applications for Part B permits. Data provided in these applications under 40 CFR 270.14 will also be examined by EPA in determining the possibility of leakage. Of particular importance will be the information required of certain facilities by 40 CFR 270.14(c)(4). This section requires that any plume of contamination that has entered the ground water from the surface impoundment be described; that monitoring data obtained during the interim status period be summarized; and that aquifers underneath the facility be described. This information should provide adequate information to allow a determination regarding leakage. EPA believes that the data provided under 40 CFR 270.14 should be of adequate quantity and quality to qualify the facility for a permit; if they are not, the facility will not be eligible for this exemption.

Section 3005(j)(3) does not contain any express limitations on eligibility for wastewater treatment impoundments that are leaking. A separate provision, Section 3005(j)(7)(C), provides that if a qualified wastewater treatment impoundment is found to be leaking, it must comply with Section 3005(j)(1) unless EPA determines that compliance is not necessary to protect human health and the environment. In effect, (j)(7)(C) gives the owner or operator of a leaking wastewater treatment impoundment the

opportunity to show that retrofitting is not necessary. EPA interprets this provision as applying to impoundments that are leaking at the time the owner or operator initially applies for the wastewater treatment exemption, as well as to impoundments that begin to leak afterwards.

Additionally, Section 3005(j)(7)(B) provides that when constituents are "likely to migrate" into ground water, EPA may impose such requirements as are necessary to protect human health and the environment, including the minimum technology requirements. The plain language of this provision indicates that it is intended to apply to situations in which EPA determines that an impoundment is likely to leak but is not currently leaking. In contrast to (j)(7)(C), (j)(7)(B) does not establish a presumption that an impoundment must comply with the minimum technological requirements. Rather, (j)(7)(B) puts the burden on EPA to determine what response is necessary.

Section 3005(j)(7)(C) by its terms applies to any surface impoundment excluded from Section 3005(j)(1) which is "subsequently determined to be leaking." This language could be read to refer only to impoundments that develop a leak after they have qualified for an exemption under Section 3005(j)(3). However, EPA does not believe that the language of the provision should be read this narrowly. The reference to a subsequent determination suggests that EPA has authority to make a determination on leakage for an impoundment (including those that are leaking when the initial application is submitted) after determining that an impoundment otherwise qualifies under Section 3005(j)(3).

Moreover, a contrary reading would lead to inconsistent treatment of leaking impoundments. If Section 3005(j)(7)(C) did not apply, Section 3005(j)(7)(B) would be the only provision that could limit the eligibility of an otherwise qualified wastewater treatment impoundment that is leaking when the owner or operator submits the exemption request. As noted above, however, Section (j)(7)(B) puts the burden on EPA to show that retrofitting is necessary to protect human health and the environment. This showing would be difficult, because the statutory and regulatory provisions designed to deal with leaks (Section 3008(h) of RCRA and Subpart F of 40 CFR Part 264) do not

presume that double liners (or equivalent) will be needed to respond to a leak. Furthermore, because EPA may withdraw an exemption only for a "change in condition" (Section 3005(j)(6)(B)) a leaking impoundment that obtained an exemption could retain it even if the impoundment continued to leak. In contrast, any impoundment that began to leak after obtaining an exemption would have a "change in condition" and would have to retrofit under (j)(7)(C). Thus, impoundments with similar leaks could be treated differently depending upon when the leak was detected.

EPA does not believe that the wording of Section 3005(j)(7)(C) clearly indicates that Congress intended this result. Nothing in the language or legislative history suggests that a different standard should apply depending on when the leak was detected. Therefore, when EPA is considering an initial application for an exemption, if the impoundment initially appears to qualify under Section 3005(j)(3) but shows evidence of leakage, EPA will also consider whether retrofitting should be required under (j)(7)(C). If EPA determines that hazardous constituents are likely to migrate to ground water from an impoundment that is not leaking, additional requirements may be imposed under (j)(7)(B).

Thus, owners and operators of impoundments that are leaking at the time of the exemption application, or that develop a leak after being granted an exemption, must retrofit unless retrofitting is not necessary to protect human health and the environment. As noted in section 3.3 of this guidance, applicants for the exemption must demonstrate compliance with applicable 40 CFR Part 264 Subpart F ground water monitoring requirements. Applicants who have received permits should be in compliance with all ground water monitoring requirements of the permit; applicants who have not yet received permits should have submitted information under 270.14(c) that is adequate to qualify for a permit.

If such information shows that the impoundment is leaking, the statute presumes that retrofitting is necessary. In order to rebut this presumption, EPA believes that the owner or operator should submit information showing that this form of source control is not needed for the particular unit. A number

of factors may be relevant, including whether the size of the plume or the constituent concentrations in ground water may increase due to continued leakage, or whether other uncertainties exist as to the future progress of the leak.

For example, the Agency believes that a facility may be able to rebut the presumption that retrofitting is needed, if ground water monitoring data show that the ground water protection standard established under 264.94 has not been exceeded and if the owner or operator can show that the conditions at the site (e.g., operating practices, nature of leak) are such that conditions would not be expected to change and retrofitting will not aid in preventing further contamination. This analysis should include examination of potential leachate seepage pathways that may not be monitored in the ground water monitoring program; such pathways might exist in shallow sand lenses or fracture zones located above the uppermost aquifer. Permitted facilities that are required to have a corrective action program, as well as other facilities whose 270.14(c) information would require the owner or operator to establish a corrective action program, may also be able to rebut the presumption if they can show that the source control provided by retrofitting would not be needed to protect human health and the environment. For example, the owner or operator might be able to show that a corrective action program would achieve compliance with the ground water protection standard prior to the time that retrofitting could be completed. On the other hand, the Agency would probably require retrofitting for an impoundment if constituent concentrations in ground water (either the uppermost aquifer or a shallow zone which is not considered an aquifer) were likely to increase due to uncontrolled leakage from the impoundment.

3.3.2 Changes in Condition

Section 3005(j)(6)(B) requires an impoundment that has a change in condition (including a leak) to comply with 3005(j)(1) (i.e., retrofit or stop receiving hazardous wastes) within 3 years after the leak is discovered (see section 1.4 of this guidance for information regarding the timing of closure).

As noted above, Section 3005(j)(7)(C) requires an impoundment that develops a leak after obtaining an exemption to comply with the minimum technological requirements, unless it is not necessary in order to protect human health and the environment. A leaking impoundment may be initially granted an exemption; however, if the nature or magnitude of the leak changes, retrofitting may be required under 3005(j)(7)(C) unless it is not necessary to protect human health and the environment. This may include noncompliance with applicable ground water monitoring standards.

3.4 GUIDANCE FOR 3005(j)(3)(C)

In addition to utilizing aggressive biological treatment and meeting applicable ground water monitoring requirements as discussed above, an NPDES facility seeking an exemption from RCRA retrofitting requirements must also demonstrate that its surface impoundment

> (C)(i) is part of a facility in compliance with section 301(b)(2) of the Clean Water Act, or
>
> (ii) in the case of a facility for which no effluent guidelines required under section 304(b)(2) of the Clean Water Act are in effect and no permit under section 402(a)(1) of such Act implementing section 301(b(2) of such Act has been issued, is part of a facility in compliance with a permit under section 402 of such Act, which is achieving significant degradation of toxic pollutants and hazardous constituents contained in the untreated waste stream and which has identified those toxic pollutants and hazardous constituents in the untreated waste stream to the appropriate permitting authority.

This portion of the guidance will discuss (1) the coverage of these two provisions; (2) what is meant by "in compliance"; and (3) the procedure for obtaining an exemption, including a description of what the applicant needs to submit with the application, and a list of sources of information for the permit writer.

3.4.1 Definitions of NPDES Terms

o NPDES: National Pollutant Discharge Elimination System. Section 402 of the Clean Water Act requires that an NPDES permit be obtained for all point

source discharges of pollutants into the waters of the United States. NPDES permits require specific control technologies for various industries and for various classes of wastes and sets technology-based effluent limitations.

o Pollutant. Any waste discharged to waters of the United States. This term is very broadly interpreted, and includes characteristics such as heat and pH.

Conventional Pollutant. Pollutants identified under CWA Section 304(a)(4). The conventional pollutants are BOD (biological oxygen demand), TSS (Total Suspended Solids), pH, fecal coliform, and oil and grease.

Toxic Pollutant. Any pollutant listed as toxic in the 1977 Senate Report on CWA Section 307(a) (40 CFR 401.15). A further breakdown of these pollutants (113 organics and 13 metals) are listed in 40 CFR Part 122 Appendix D.

Nonconventional Pollutants. Any pollutant which is not formally listed as a toxic or a conventional pollutant. Many nonconventional pollutants exhibit toxic effects.

o Effluent Limitation Guideline. Regulations adopted under CWA Section 304(a) to establish effluent limitations for a category of discharges.

o Effluent Limitation. Any restriction on the discharge of pollutants from point sources.

o BPT: Best Practicable Control Technology Currently Available. These treatment technologies, defined by EPA for categories of discharges, focussed primarily on mainly conventional pollutants. Under CWA Section 301(b)(1)(A), industries with NPDES permits were required to install BPT by July 1, 1977.

o BCT: Best Conventional Pollutant Control Technology. These treatment technologies are defined by EPA for categories of discharges of conventional pollutants under CWA Section 301(b)(2)(E). Compliance, through NPDES permits, was required by July 1, 1984.

o BAT: Best Available Technology Economically Achievable. These treatment technologies are defined by EPA for categories of discharges of toxic and nonconventional pollutants under CWA Section 301(b)(2). Compliance, through NPDES permits, is required by July 1, 1984, for toxic pollutants and within three years of promulgation (no later than July 1, 1987) for nonconventional pollutants.

o BPJ: Best Professional Judgment. Limitations established on a case-by-case basis under CWA Section 402(a)(1) to control pollutant discharges where effluent limitation guidelines do not cover the pollutant or discharge. The majority of initially-issued NPDES permits were issued using BPJ. Also known as BEJ (Best Engineering Judgment).

3.4.2 Scope of Provisions

With respect to the provisions of 3005(j)(3)(C), there are three categories into which a facility could fall: (1) the facility has a BAT permit; (2) the facility has a BPT permit and there are applicable BAT effluent guidelines in effect; or (3) the facility has a BPT permit and there are no BAT effluent guidelines in effect. Facilities in categories 1 and 2 are eligible for the 3005(j)(3) exemption upon satisfying the requirements of subparagraph (C)(i). Facilities in category 3 must satisfy the requirements of subparagraph (C)(ii).

3.4.2.1 Facilities with BAT Permits

Section 3005(j)(3)(C)(i) requires the owner or operator to show that the impoundment for which an exemption is requested is "part of a facility in compliance with Section 301(b)(2) of the Clean Water Act." Section 301(b)(2) refers to BAT and BCT effluent limitations, established either in accordance with effluent limitations guidelines or on a case-by-case basis by the permit writer using best professional judgment (BPJ). The Agency interprets the language of 3005(j)(3)(C)(i) as requiring an owner/operator to show only that the facility is in compliance with BAT effluent limitations. Although Section 301(b)(2) of the Clean Water Act (CWA) references BAT and BCT, RCRA Section

3005(j)(3)(C)(ii) refers to effluent guidelines in CWA Section 304(b)(2), which are BAT only. Therefore, to make 3005(j)(3)(C)(i) and (C)(ii) parallel, a reasonable construction of (C)(i) is that it requires compliance only with BAT effluent limitations as contained in the NPDES permit. This interpretation is consistent with the legislative history, which specifies that this provision applies to a facility that is in compliance with "best available technology effluent guidelines issued under the Clean Water Act" (130 Cong. Rec. S9182 (daily ed., July 25, 1984)).

Thus, if a facility has a BAT permit (i.e., there are effluent limitations that are based either on a guideline or on a BPJ/BAT determination), compliance with the BAT limitations in that permit will constitute compliance with CWA Section 301(b)(2) for purposes of this exemption. However, noncompliance with the BAT permit does not necessarily mean that the facility is ineligible for the exemption, because effluent limitations in a BAT permit (i.e., one that has effluent limits that are at least equal to BAT) may be based on either technology-based or water quality-based requirements. A permittee applying for an exemption under 3005(j)(3)(C)(i) may be in violation of water quality-based requirements and still be eligible for the exemption if he is able to demonstrate compliance with all the less stringent technology-based requirements. The standard for determining "in compliance" is discussed below in Section 3.4.3 of this guidance.

3.4.2.2 Facilities with BPT Permits

3.4.2.2.1 Facilities with BPT Permits for Which Effluent Guidelines are in Effect

Facilities with BPT permits for which there are applicable BAT guidelines in effect must meet the requirements of Section 3005(j)(3)(C)(i). Compliance with (c)(ii) would not qualify them for the exemption. The owner or operator of such a facility must demonstrate that, although the facility does not have a BAT permit, the facility is nevertheless in compliance with the applicable BAT guidelines. If BAT guidelines are at least as stringent as the facility's

BPT permit, a demonstration of compliance with the permit is sufficient to meet 3005(j)(3)(C)(i). If BAT guidelines are more stringent than the facility's BPT permit, the owner or operator must show that his discharge is in compliance with the applicable BAT limit.

If a facility has a BPT permit that covers multiple waste streams and BAT guidelines are in effect for some but not all of the waste streams, the facility is eligible for an exemption under paragraph (C)(i). The permittee must demonstrate that the facility is in compliance with BAT for those waste streams covered by the BAT guidelines, and with BPJ (Best Professional Judgment) calculations of BAT limits for the remaining waste streams. Section 3005(j)(3)(C)(ii) would not apply to an impoundment in such a facility because, as noted in section 3.4.2.2.2 below, (C)(ii) applies only to facilities for which no effluent guidelines are in effect.

3.4.2.2.2 Facilities with BPT Permits for Which No Effluent Guidelines are in Effect

Any facility for which no effluent guidelines required under Section 304(b)(2) of the Clean Water Act are in effect and no BAT permit has been issued must meet the requirements of Section 3005(j)(3)(C)(ii). The first requirement of (c)(ii) is that the impoundment for which the exemption is sought be part of a facility in compliance with its existing permit under Section 402 of the Clean Water Act.

Unlike (C)(i), applicants seeking an exemption under this section must show that the facility is in compliance with all permit conditions, not just the effluent limitations. This is consistent with the plain language of Section (C)(ii) which requires compliance with the permit. However, what is required is not absolute compliance with all permit limits. Rather, the facility will be evaluated for general compliance, taking into account a number of factors which are discussed in section 3.4.3 below.

The second part of 3005(j)(3)(C)(ii) requires BPT permittees for which no effluent guidelines are in effect to demonstrate that they are achieving "significant degradation of toxic pollutants and hazardous constituents

contained in the untreated waste stream. . . ." A direct reading of the amendment and a review of the legislative history support application of the "significant degradation" requirement only to BPT permits.

EPA believes that Congress wanted to ensure that BPT permittees were removing the toxic and hazardous constituents in the effluent to the extent feasible for the particular industry. Thus it seems reasonable to construe "significant degradation" as requiring BPJ calculations of BAT limits for the permittee's toxic pollutants and hazardous constituents. "Hazardous constituents" are constituents identified in Appendix VIII of 40 CFR Part 261. "Toxic pollutants" are those identified pursuant to CWA Section 307(a) and listed in 40 CFR 401.15. How the regulatory agency makes this BPJ determination of BAT is discussed in section 3.5 of this guidance ("Procedure for Obtaining an Exemption"). If these calculated limits equal the limits in the BPT permit, a demonstration of compliance with the permit will satisfy this requirement. If the calculated limits are greater than the permit limits, the applicant will have to show the calculated limits are met at the time the application is submitted.

The legislative history indicates that the intent of this provision was to consider the entire waste stream operation at a facility, rather than at each impoundment (130 Cong. Rec. S9183 (daily ed.; July 25, 1984)). The following colloquy illustrates this:

> MR. BENTSEN.
>
> * * *
>
> ["Significant degradation of toxic pollutants and hazardous constituents"] is intended to apply to the waste water treatment facilities as a whole. It does not require that each impoundment of a multi-impoundment system must achieve a significant degradation. It does not require that the impoundment system taken as a whole must achieve a significant degradation where other components of the waste water treatment system have significantly degraded the toxic pollutants or hazardous constituents in the untreated waste stream. For example, in some instances it is more effective and appropriate to remove contaminants from waste streams prior to sending them to the biological waste water treatment system. Thus, the test required in this amendment is intended to look at the entire waste water treatment operations at a facility. Is this the Senator from Rhode Island's understanding of the terms in this amendment?"

MR. CHAFFEE. The Senator from Texas has accurately described the intent of this phrase.

3.4.3 Meaning of "In Compliance" for Purposes of 3005(j)(3)(C)

3.4.3.1 Initial Determination

Section 3005(j)(3)(C) requires the owner or operator to show that the surface impoundment for which an exemption is being sought is part of a facility which is either in compliance with BAT guidelines or is in compliance with a BPT permit issued under Section 402 of the CWA. The legislative history indicates that for the purpose of obtaining an exemption, absolute compliance with BAT guidelines or a BPT permit (which is the standard for noncompliance for purposes of determining violations under CWA) is not to be required. Rather, it appears that by this provision Congress intended to ensure that a facility seeking an exemption is well-run and generally meets the terms and conditions of its permit or BAT guidelines. (See 130 Cong. Rec. S9183-84 (daily ed., July 25, 1984)).

In light of this, EPA has determined that "compliance" for the purpose of Section 3005(j)(3)(C) can only be evaluated on a case-by-case basis, by analyzing the nature, cause, and extent of any violations. Although the legislative history makes reference to statistical assessments as part of guideline and permit development under the Clean Water Act, EPA believes that this was merely illustrative of congressional intent not to require absolute compliance, and should not be read to require a determination of compliance based upon a statistical demonstration. Instead, the applicant's compliance history for 1 year prior to the date of the exemption request should be evaluated, as a year's data should be sufficient for any patterns of violations to become apparent.

As stated above, when evaluating a facility for an exemption under 3005(j)(3)(C)(i), the only relevant factors are those relating to compliance with the BAT effluent limitations. However, for a facility to which

3005(j)(3)(C)(ii) applies, violations of all permit limits are to be taken into account, although the permitting authority may consider the relative significance of the violations in determining if an exemption is appropriate.

Listed below are factors that may be taken into account in making the compliance determination. This is a general list; the factors may vary in significance in the judgment of the NPDES or RCRA permitting authority when applied to particular circumstances.

o The parameter of limitation violation. A violation of a BAT permit effluent limitation for toxic or nonconventional pollutants should generally be of greatest concern. However, BAT limitations for conventional pollutants may be indicators of toxic pollutants or of hazardous constituents. Therefore, the intent of the parameters limited should be considered by reviewing the permit fact sheet.

Where compliance with a BPT permit is being evaluated (for which compliance with permit limits for conventional, nonconventional, and toxic pollutants is required, as well as other permit requirements), violations of toxic or nonconventional pollutant limits generally should again be of greater concern than the limits for conventional pollutants, unless the conventional pollutant is an indicator for toxics and nonconventionals.

o The duration of any violations. Other things being equal, a violation of long duration should be of greater concern than a violation which occurred for only a short period of time or was an isolated instance. (For example, if only the daily maximum was exceeded, as opposed to the daily maximum and the monthly average, then the violation was of short duration.)

o The magnitude of any violation. An exceedance slightly over the permit limit is generally of less concern than an exceedance substantially over the permit limit (e.g., 20 percent or greater exceedance would be substantial for some industries).

o The frequency and/or pattern of violations during the compliance period. Violations of the same parameters or pollutants which occur regularly over a period of several months are indicative of a recurring pattern of noncompliance which should be of greater concern that irregular and nonrepeated violations for different parameters or pollutants.

o Actions the owner or operator has taken to correct any noncompliance. An ongoing violation should generally be given greater scrutiny than a past violation which has been corrected. A past violation, however, may have been of such a nature as to preclude eligibility for the exemption.

o Enforcement actions. The Agency will take into account any pending administrative or judicial actions by a citizen group or other party relating to the applicant's discharge of pollutants, as well as any administrative or judicial actions pending against the applicant for permit noncompliance.

Formal EPA or State enforcement actions may lead to a judicial determination that the facility has not complied with its permit, or a consent agreement requiring that the permittee take all necessary steps to achieve compliance with the permit. The facility would not be eligible for the exemption in Section 3005(j)(3)(C)(i) if the subject of the action was a violation of a technology-based effluent limitation or compliance schedule implementing such requirements and the facility cannot demonstrate compliance for 1 year after the enforcement action or judicial determination. Generally, the facility should have met the requirements of the technology-based effluent limitation or compliance schedule. Compliance should be evaluated on the performance for at least 1 year prior to the application for an exemption, or the facility should have made significant improvements in its treatment system within the preceding year. However, the permitting authority may determine that mitigating circumstances warrant consideration of a shorter period of time in judging compliance.

A determination of noncompliance in such an enforcement action is, per se, a determination that the facility is not in compliance with the effluent limitation. As noted above, 3005(j)(3)(C)(i) requires a showing of compliance

with BAT effluent limitations. Thus, if the underlying violation was, for instance, a water quality-based effluent violation or a reporting violation unrelated to compliance with BAT, the applicant may still be eligible for the exemption if he can demonstrate compliance with the applicable technology-based requirement.

A final determination in a formal action against a facility with a BPT permit for permit noncompliance that is made less than 1 year prior to the date of the application for the exemption should disqualify the unit for the exemption under 3005(j)(3)(C)(ii), which requires that the facility be in compliance with a BPT permit, unless the permit writer considers that a shorter period is appropriate. As noted above, where BPT permittees under (C)(ii) are concerned, this would apply to violations of any permit requirement, not just the effluent limitations. The decision in an enforcement action may be considered to be an Agency determination that the facility was not in compliance with its permit.

o Compliance with existing administrative or judicial orders. If the underlying violation is relevant to the exemption decision, EPA will consider whether the applicant has fulfilled all the requirements of the order, and whether the permittee has supplied to the Agency any information required by the order (to the extent that such reports are necessary to verify compliance status).

o Any other factors. Any other factors which would tend to show whether a facility is meeting the terms of its permit or BAT effluent limitations should also be considered.

The Clean Water Act requires absolute compliance with permit conditions and other applicable requirements unless the permittee can satisfy the affirmative defenses (upset, bypass) included in the CWA regulations. Any violation, no matter how minor, may be the subject of an enforcement action; there is no acceptance level of violation. The discussion in this guidance is strictly for purposes of determining the eligibility for an exemption for retrofitting requirements and was devised to meet the requirements and

objectives of Section 3005(j)(3) of RCRA. A determination of such eligibility does not insulate a facility from an enforcement action under CWA for any permit violation.

3.4.3.2 Change in Condition

The requirement to be "in compliance" with CWA Section 301(b)(2) or a BPT permit is an ongoing obligation. Section 3005(j)(6)(B) requires exempted facilities which no longer satisfy the exemption requirements due to changed circumstances to comply with (j)(1) (i.e., retrofit or stop receiving hazardous wastes) within 3 years of the date of the changed circumstances. In evaluating whether the facility is no longer in compliance, the same standard of overall compliance set forth earlier in this guidance will be utilized. As a condition to receiving the exemption, an applicant may need to submit additional reports so that continued compliance can be monitored.

The eligibility of a facility with a BPT permit which qualifies for an exemption under 3005(j)(3)(C)(ii) may need to be reexamined under the (C)(i) exemption on the effective date of the BAT guidelines applicable to that facility. Inasmuch as the BPT facility has already made a demonstration of compliance with the permit and significant degradation under (C)(ii), it may not always be necessary to automatically require such facilities to make a demonstration under (C)(i). Such a demonstration would only be required if there is reason to believe that the facility may not meet the (C)(i) requirements.

3.5 PROCEDURE FOR OBTAINING AN EXEMPTION

Section 3005(j)(5) sets forth the requirements for applying for a 3005(j)(3) exemption. Section 3005(j)(5) requires that an applicant for the exemption must apply to the EPA Administrator (or the State, where the State has an authorized RCRA program) by November 8, 1986. With this application, the applicant must submit (A) its RCRA permit application; (B) evidence of compliance with applicable ground water monitoring requirements; (C) all reasonably ascertainable evidence as to whether the surface impoundment is

leaking; and (D) a certification by a registered professional engineer with academic training and experience in ground water hydrology that, based on analysis of those toxic pollutants and hazardous constituents that are likely to be present in the untreated waste stream, the impoundment satisfies the conditions of Section 3005(j)(3).

The application requirements in Section 3005(j)(5)(A) through (C) also apply to other exemptions under Section 3005(j). Application requirements under 3005(j)(3) are consistent with the requirements described in this guidance for applications for the other exemptions. Subsection (D) only applies to facilities with BPT permits under 3005(j)(3)(C)(ii) (i.e., BPT permittees where there are no applicable guidelines), as those are the only facilities that have to demonstrate significant degradation of toxic pollutants and hazardous constituents contained in the untreated waste stream.

Applicants should ensure that the reviewing agency has the information it needs to make the exemption determination, including: discharge monitoring reports; compliance inspection reports; DMRQA sample performance, permittee noncompliance reports; and any other data that may be relevant to the determination. Information for the period 1 year prior to the date of the exemption request will be reviewed, so applicants should verify that the information is complete for that time period.

Applicants who must demonstrate compliance with applicable effluent guidelines and who must show significant degradation should ascertain the appropriate BAT limits and verify compliance with the limits from plant operating data and submitted data already available to EPA in Discharge Monitoring Reports (DMR's). The NPDES permitting authority will review the permittee's information and confirm whether or not the permittee qualifies for the retrofitting exclusion. With regard to a BPT permittee for whom there are existing effluent guidelines in effect, if the BAT guidelines would require compliance with limits for additional pollutants that are not currently required to be monitored by the BPT permittee, the permittee should provide influent and effluent mass and/or concentration data for the daily maximum and monthly average limitations for those pollutants for a minimum of

30 consecutive days of monitoring. The application should also include average daily production figures for the period monitored (in the same units required in the guideline) and specify whether the pollutant monitored is an intermediate or final product or byproduct of the process. If a facility falls under one of the industrial categories listed in Table 2C-2 of 49 Federal Register 38059 (Testing Requirements for Organic Toxic Pollutants Industry Category), the monitoring data should include testing for all applicable parameters listed in Table 2C-2, unless previously submitted to the Agency.

A BPT permittee making a demonstration under 3005(j)(3)(C)(ii) also should identify in an application for an exemption those toxic pollutants and hazardous constituents in the untreated waste stream. As the legislative history (130 Cong. Rec. S9183 (daily ed., July 25, 1984)) indicates, this requirement is intended to apply to the waste water treatment facility as a whole, rather than to each impoundment. Thus, the applicant should identify the toxic pollutants and hazardous constituents entering the facility, not the individual impoundment(s) for which the exemption is being sought.

The legislative history to this provision suggests that the BPT permittee need not sample, internally monitor, or make a determination regarding the absence of every toxic pollutant and hazardous constituent. However, the permittee must identify those toxic pollutants and hazardous constituents that, based on the hazardous wastes in the waste streams, are known to be, or that there is reason to believe are, in the untreated waste stream. To the extent the permittee knows of the presence of these pollutants and constituents in the waste water entering the facility, he must communicate that information to the agency considering the exemption application. (See 130 Cong. Rec. S9183 (daily ed., July 15, 1984).

The determination under 3005(j)(3)(C)(i) as to whether a facility with a BPT permit is in compliance with BAT guidelines is part of the process of BAT permitting. (The BAT permitting process also considers water quality issues, which are not relevant to paragraph (C)(i)). In the BAT permitting process, permit limits are not set by an automatic application of the guidelines, but

rather take into account variables such as disparate waste streams, production, and flow. In order to avoid unnecessary duplication of effort, EPA Regions and States with authorized programs are strongly encouraged to act simultaneously upon the facility's BAT permit application and the retrofitting exemption request.

3.5.1 Sources of Information for the Regulatory Agency

The regulatory agency must make the determination that the applicant for the exemption is "in compliance" as that term is defined in section 3.4.2 of this guidance. In addition to the data and other information submitted by the applicant, there are other information sources that may prove helpful in making a compliance determination.

o The NPDES Quarterly Noncompliance Report (QNCR). The QNCR is a reporting tool used by the EPA Regions and NPDES States to record instances of noncompliance by major dischargers. The QNCR includes information on noncompliance with permit effluent limitations, enforcement orders, and reporting requirements. The purpose of the QNCR is to provide information to the Agency by which it can assess the effectiveness of State and EPA Regional compliance activities and thereby best determine how to manage or oversee program activities. (See 40 Federal Register 34648). It does not establish criteria for selecting enforcement actions nor does it codify enforcement policy. The QNCR may be useful in the context of the exemption from retrofitting requirements in that the listing of a facility on the QNCR should be a signal to the regulatory authority that the facility's application for an exemption warrants close scrutiny.

o Discharge monitoring reports. These are the self-monitoring data from the applicant. If the data are incomplete, EPA should consider the missing measurements to be violations for the purposes of the 3005(j)(3)(C(ii) exemption.

o Compliance inspection reports. These should be reviewed whenever available in order to determine if special operation and maintenance problems were encountered or if the permittee has failed to control hazardous materials

or spills. The inspection reports also could include an evaluation of construction activities and progress toward achieving compliance with final effluent limits. In some cases, inspections may be needed to support the determination for the exemption.

o DMRQA sample performance. This is an indicator of the overall quality of the self-monitoring data. Past performance on the DMRQA would be especially important if the compliance record is inconsistent or if the pollutant loadings are very close to the limit. If the quality of the effluent data appears to be poor, EPA may require additional testing by the applicant to ensure that it has accurate information on which to make a judgment.

o Permittee noncompliance reports. These must be submitted as required by 40 CFR 122.41 for each violation of a limit. In addition, the regulatory agency may require additional information and an explanation of how the permittee resolves the violations. For each violation, EPA should review the circumstances, the permittee's responses, any corrective action, and the results. During this review, EPA should note in particular any recurring problems that the permittee has reported but not addressed adequately, any failure to submit a report, other patterns of violations, and the circumstances of any violations.

o Permit applications. NPDES and RCRA permit applications may be helpful to the regulating agency in obtaining background information about the facility and how it operates.

o Citizen Complaints.

o Any other sources of relevant data. To make a determination under Section 3005(j)(3)(C)(ii) that significant degradation of toxics and hazardous constituents has been achieved, the regulatory agency will have to make a BPJ determination of what the BAT limits for toxics and hazardous constituents would be. The support documents for the effluent guidelines that have not yet been promulgated may be helpful for this. Also, support documents for

effluent guidelines for an industrial category which is similar to that of the applicant may be used. Where the BPJ determination of BAT equals the BPT limits in the permit, compliance with the permit is all that will be necessary. Where the calculated limit is above that in the permit, the applicant will have to provide data showing that he achieves the higher limit.

3.5.2 Inter- and Intra-Agency Coordination in the Decisionmaking Process

The determination required under 3005(j)(3)(C)(i) and (ii) goes beyond the administrative and technical boundaries of the RCRA permit writer. The review of applications filed for this exemption will require close coordination between RCRA Programs personnel, as it is they who will be making the exemption determination, and Water Programs personnel at both the Federal and State level, as they have the information on the NPDES permittee and experience with the requirements. (Where the State has been approved to administer the NPDES program, it will have the records of the permittee.) Thus, the RCRA programs will be relying heavily on the NPDES permitting authorities' decisions. The scope of interagency coordination will be detailed in a memorandum to the Regions.

SECTION 4

THIRD EXEMPTION

4.1 STATUTORY PROVISIONS

As provided in Section 3005(j)(4), certain surface impoundments may be eligible for an exemption from, or a modification of, the minimum technological requirements based on a demonstration of "no migration." The statute states that:

> The Administrator (or the State, in the case of a State with an authorized program), after notice and opportunity for comment, may modify the requirements of paragraph (1) for any surface impoundment if the owner or operator demonstrates that such surface impoundment is located, designed and operated so as to assure that there will be no migration of any hazardous constituent into ground water or surface water at any future time. The Administrator or the State shall take into account locational criteria established under Section 3004(o)(7).

4.2 GUIDANCE FOR THE THIRD EXEMPTION

Unlike the first exemption, retrofit requirements under the third exemption may be waived even if the surface impoundment does not have a liner and/or is located within one-quarter mile of an underground source of drinking water.

Rather than making specific requirements, Congress intended the third exemption to be a performance-based variance that requires the owner or operator to demonstrate compliance based on location, design, and waste characteristics particular to the facility. The exemption is provided in recognition of the fact that certain site-specific and waste-specific characteristics may prevent the movement of hazardous waste and constituents into ground and surface water. Consistent with other performance standards, this exemption serves as a mechanism by which owners and operators may identify and describe factors such as waste attenuation, degradation, and migration rates that will assure no migration of hazardous constituents.

Applicants for this exemption are required to submit a report documenting procedures, results, and conclusions, thereby providing the permit writer with a basis for evaluating the adequacy of the exemption request.

Owner/operators of any surface impoundment may apply for this exemption. However, EPA believes that the only type of unit that could meet the requirements under this exemption under normal circumstances would be a storage surface impoundment (at which wastes, liner(s), and contaminated soil are removed or decontaminated at closure) having at least a thick constructed soil liner of extremely low permeability. The reasons for this belief are described below. It should be noted that EPA does not believe Congress was referring to industrial point source discharges subject to NPDES permits when prohibiting migration to surface water; because this is a liner variance, it addresses migration in subsurface soils rather than migration through other media such as surface discharge. For that reason, facilities with NPDES permits are eligible for the exemption, provided the demonstrations described below are made.

The primary issue to be addressed under this exemption is that there will be no migration of any hazardous constituent into ground water or surface water at any future time. Although the owner/operator of any impoundment can apply for this exemption, it is EPA policy that design information based on manmade liner systems is not by itself adequate to prove that no migration will occur. The owner/operator of either a storage or disposal facility will be required to make a clear demonstration that hazardous constituents will not migrate to ground water or surface water during the unit's active life as well as during and following closure.

In some situations, the nature of the waste could facilitate the demonstration. Such a case would be one in which a corrosive waste exhibiting low pH passes into a neutralization pond that contains no hazardous constituents or other wastes whose characteristics could classify it as a hazardous waste. In this case, there may be no hazardous constituent to migrate beyond the unit. More often, however, the applicant will have to make the demonstration of no migration as outlined in Section 4.2.1 or in Section 4.2.2 of this guidance.

4.2.1 Demonstration of "No Migration" Based on Test and Model Data

At a minimum, the reviewing agency will require: (1) liner/leachate compatibility test data similar to those required for the first exemption (see Section 2.2.1 of this guidance); (2) wetting front calculations from the first day the unit went into service documenting the extent of current and potential future leachate migration; and (3) documentation of hazardous constituent attenuation in the unsaturated zone. In addition, the applicant should detail closure and postclosure plans that ensure that there will be no contaminant migration to ground or surface water during or after closure. For storage and treatment impoundments (whose wastes, liners, contaminated soil, and saturated soil are to be removed), the applicant should also set a firm closure date. This closure date should be before the time that leachate is expected to migrate through the liner into adjacent soil.

Congressional requirements for double liner systems and EPA regulations imply that manmade systems will leak at some future time. Therefore, applicants should not rely on assumptions about the long-term reliability of engineered components in making the "no migration" demonstration.

It will be extremely difficult to prove that no migration of any hazardous constituent will occur after closure for any type of disposal impoundment. As noted above, the only type of units that EPA believes will normally be able to meet the requirements under this exemption are certain storage surface impoundments (at which wastes, liners, and contaminated soil are removed or decontaminated at closure) having at least a thick constructed soil liner of extremely low permeability. The legislative history indicates that "any future time" should be read literally (see 130 Cong. Rec. E4455, (daily ed., Oct. 10, 1984)). Congress was concerned about leakage at any time, even after closure. For all disposal units, regardless of whether they have a synthetic or clay liner, EPA will require a rigorous showing that there will be no migration of hazardous constituents to ground or surface water at any future time.

4.2.1.1 Meaning of "Ground Water or Surface Water"

The provisions of the third exemption do not specify the condition of the ground water or surface water. Therefore, EPA interprets this provision as referring to the closest source of ground water or surface water, whether contaminated or noncontaminated, usable or nonusable, as the point to which there must be no migration of any hazardous waste or constituents. As used in this provision, "ground water" includes, but is not limited to, all USDW's and all aquifers; it encompasses "all water below the land surface in a zone of saturation" (40 CFR 260.10). A demonstration of no migration in saturated soil would not be appropriate for this exemption because waste migration into the saturated zone is interpreted as ground water contamination. Because Section 3005(j) is concerned with migration that could be prevented through the installation of a double liner and leachate collection system and because the escape of hazardous wastes or constituents through overtopping, surface water runon and runoff, and/or erosion are addressed independently in various sections of 40 CFR Part 264, the demonstration of no migration to surface waters for this exemption should address migration in subsurface soils. The demonstration of "no migration" to both ground water and surface water should therefore be made for the unsaturated soil beneath the facility.

4.2.1.2 Meaning of "Hazardous Constituent"

For the purposes of this exemption, "hazardous constituent" means a constituent that is listed in Appendix VIII of 40 CFR Part 261.

4.2.1.3 Demonstration of "No Migration"

The "no migration" demonstration submitted by the applicant should be comprehensive and detailed and should cover every aspect of waste migration in the unsaturated zone.

The persistence and degradation potential of the waste in the environment should be explained and fully documented with appropriate sampling and analysis data. The prediction of no migration at the compliance point should

be supported by a modeling study using site-specific data. All modeling results and procedures should be provided to document all conclusions. Quality assurance (QA) and quality control (QC) measures taken during the no migration analysis should also be documented by identifying QA/QC procedures used and estimates of the reliability of the conclusions.

The applicant should demonstrate no migration to a level of certainty that will ensure that results and conclusions are accurate and reliable. This level of certainty should account for conditions that may occur as a consequence of future natural events or uncontrolled human intrusion. To attain an adequate level of certainty, the applicant should provide an estimate of error that is based on a sensitivity analysis that accounts for all parameters included in the no migration analysis. All data should be demonstrated to be accurate. Field data (such as hydraulic conductivity developed using Test Method 9100) should be used to calibrate and verify modeling calculations.

The unsaturated zone is the transport medium of primary concern in the demonstration of no migration. Any migration of waste that should occur is most likely to occur in the unsaturated soil beneath or adjacent to the unit in question. Therefore, results from this demonstration should indicate the ability of the unsaturated zone to attenuate the waste and the likelihood of the waste migrating through the unsaturated zone to the closest ground water or surface water.

The application should therefore contain a detailed evaluation of site hydrogeology and estimated contaminant fate and transport. To demonstrate mobility in the unsaturated zone, the following general information should be presented in the application and confirmed by the permit writer:

- Hydraulic conductivity as a function of water content or pressure potential;
- Porosity of the medium, particle and bulk densities, water capacity, and diffusivity;
- Soil-water retention curves;

- Infiltration, drainage, evaporation and transpiration rates and volumes;
- Hydrogeologic maps and cross sections;
- Parametric values for the dispersion and adsorption and ion exchange properties;
- Effects of permeant on soil;
- Location and strengths of contaminant sources;
- Basic physical and chemical properties of the contaminants;
- Estimation of degradation potential (for given constituents) within the unsaturated zone; and
- Estimation of adsorption potential (for given constituents) within the unsaturated zone.
- Constituent loading rates

EPA will soon publish Guidance Criteria for Identifying Areas of Vulnerable Hydrogeology in response to the requirements of Section 3004(o)(7) of RCRA. This guidance will contain methods for modeling migration in the unsaturated zone. Applicants may find this valuable for analytical support. In addition, in evaluating exemption requests based on "no migration," the Agency will also review any ground water monitoring data to determine if there have been any releases to ground water in the past.

4.2.1.4 Documentation Requirements

Any modeling procedures and results used by the owner/operator to evaluate the potential for migration should be included in the application for this exemption. Documentation of all parameter values used, all assumptions associated with the model, and the error associated with the model predictions should be included in this demonstration. The conceptual model developed for the unsaturated zone should be fully described. Finally, the modeling approach to the particular problem should be described in detail and it should be demonstrated that the model is appropriate for use in the specific problem.

4.2.2 Demonstration of "No Migration" Based on Inward Hydraulic Gradient

Another way to meet the "no migration" standard is to design the impoundment so that pumping will hold the hydraulic head in the impoundment below that in surrounding geologic units (Ross, 1985). An inward hydraulic gradient is thus established, preventing outward movement of ground water. The impoundment must be in a pit below the water table; the inward gradient will cause a constant flow of ground water into the impoundment. A mixture of ground water and waste water will be pumped out; all of this water must be treated in an appropriate way before being discharged.

To prevent migration, the gradient in such an impoundment must be directed inward at all times and from all directions. The application should state a maximum permissible water level in the impoundment, or present the method by which the maximum permissible level (which might vary over time) will be calculated. The allowable difference between ground water head and impoundment head should be set on a case-by-case basis to reflect the variability and uncertainty of the heads, but in no case should be less than one foot. (This is a minimum value, based on the accuracy of good head measurements. It may be revised upward as appropriate.)

When the facility is closed, pumping will cease and the facility will no longer have the inward gradient that is responsible for preventing migration. The applicant will therefore have to remove all hazardous contamination from the site at the time of closure. It should be realized that such closure below the ground water could be quite difficult to accomplish in the field due to the constant influx of water while the contaminated liner (if any) and/or soil is proceeding.

The information required to evaluate an application for an exemption in the case where inward gradients are being relied upon is quite different from that required for the "no migration" demonstration based on testing and modeling data. Most of the technical analyses described in Section 4.2.1 of this guidance are unnecessary. Specifically, there is no need for an unsaturated-zone analysis, an attenuation analysis, or any kind of

mathematical model of subsurface migration. The technical issues on which permit writers should focus are adequacy and reliability of measurements (historic and ongoing) of heads, and adequacy and reliability of pumps. There may be complex hydrological factors that make an inward gradient inappropriate for some sites; EPA will make the determination on a case-by-case basis.

The applicant should address all considerations involved in ensuring that inward gradients are reliably maintained. Among the considerations to be addressed are those discussed in sections 4.2.2.1 to 4.2.2.9 of this guidance.

4.2.2.1 Pump Capacity and Reliability

Pumps must be able to hold the water level in the impoundment below the required level at all times. At a minimum, this requires backup pumps and power supplies. Pumps will have to be large enough to deal with inflows of surface water from precipitation and runoff during storms.

4.2.2.2 Flooding

Ordinarily, pumping equipment would not be able to deal with the inflows to impoundments during floods. The impoundments should therefore not be located in areas subject to flooding in a 100-year flood.

4.2.2.3 Piping

Although it is recognized that a minimum head below the ground water must be maintained, it is just as important not to allow the head difference to be high enough to reach critical gradients through the soil liner and foundation. Piping and loss of fines that affect the integrity of the liner/foundation would occur if the critical gradient is reached or exceeded.

4.2.2.4 Water-Table Fluctuations

The applicant must demonstrate that water-table fluctuations, whether year-to-year, seasonal, or irregular, will not bring the ground water head below the head maintained in the impoundment. In general, it will be

necessary to monitor water levels outside the impoundment at least monthly, and usually at least weekly. The number of monitoring points must be decided on a case-by-case basis, but in a low-permeability medium more than one will usually be required. In some cases, it may be possible to determine a minimum head for the hydrogeologic units near the impoundment, either from frequently measured hydrographs extending over many years or from aquifer geometry. Such a minimum head could be used to determine impoundment water levels; however, a minimum of one piezometer should always be monitored.

Real-time monitoring of water levels in the impoundment and in one or more wells could be used to operate pumps automatically whenever the difference falls below a preset level. This is an acceptable approach, but the applicant would have to demonstrate the reliability of the equipment.

However it is controlled, pumping cannot bring water levels below the bottom of the impoundment. The applicant should show that the impoundment is deep enough so that the base of the impoundment is below the minimum potentiometric level of the ground water in the vicinity. Alternatively, a contingency plan could be provided by which the impoundment will be pumped dry and cleaned of contamination if potentiometric levels approach the bottom of the impoundment.

The water table near an impoundment could be greatly lowered by pumping in new water wells or dewatering for nearby construction projects. The applicant should show that this will not occur.

4.2.2.5 Uniformity of Head in Impoundment

Heads in any sludge or solids in the impoundment could differ from the measured water level. The applicant should ensure that they do not exceed the allowable value. In general, this can be done by ensuring that solids will not stand above the permissible water level at any time.

A further precaution is required for compressible solids such as clayey sludges, which could be consolidated by the weight of any additional solids placed above them. When the total stress applied to a compressible porous

medium is increased, the additional stress is initially transferred to the water in the pores as an increase in pressure. The increase in water pressure cannot exceed the increase in total stress applied to the porous medium because if the two are equal, the effective stress on the porous medium is unchanged. If the porous medium has a low permeability, the increased pressure can take a long time to drain out (Freeze and Cherry, 1979).

Solids to be placed in an impoundment depending on inward gradients should be tested for compressibility. The allowable thickness of compressible low-permeability solids in the impoundment should be set equal to the allowable height of standing water (less the depth of any water that will stand above the sludge), divided by the density ratio of wet sludge to water.

4.2.2.6 Fluid Density

The water in impoundments may have a considerable content of dissolved solids that cause its density to exceed that of pure water, or impoundments may hold dense, immiscible fluids such as chlorinated hydrocarbons. Even if an inward gradient is successfully maintained, it still can be possible for dense fluids to migrate out of the impoundment due to rotational circulation induced by density-driven instabilities. When this happens, a finger of dense water descends from the impoundment, displacing the lighter aquifer water.

It is not acceptable to place water or other fluids with a density significantly greater than that of the surrounding ground water in impoundments with inward gradients. Density effects can be ignored if water in an impoundment will contain less than 1000 milligrams per liter of total dissolved solids. (The value of 1000 mg/L is only a very rough estimate and might be too high or too low; a careful analysis would be required to set a proper value.) Otherwise, the density difference that would be considered significant must be evaluated on a case-by-case basis. One way for the applicant to demonstrate that a density difference is not significant is by a mathematical analysis of the hydrodynamic stability of the system.

4.2.2.7 Aquifer Nonuniformity

Head variability within the geologic units around the impoundment can cause migration away from it. In porous sedimentary media, permeable layers or lenses within otherwise low-permeability units can gave different heads. If such units are present in the vicinity of an impoundment, small cracks might connect them with the impoundment. It should therefore by verified that heads in the impoundment are kept below the heads in any nearby permeable beds or lenses. This will, in some cases, require measurements of heads in specific packed-off intervals rather than only in open wells.

In fractured rocks, different fractures, even very close to each other, may be poorly connected and have a considerable difference in head. If two fractures with different heads contact an impoundment or a liner close to each other, cross-circulation through the impoundment can occur even if both heads are above the head in the impoundment. Applicants for impoundments located in fractured rock should therefore show that either (a) the rock matrix is of such high permeability (as in the case of a fractured sandstone) that significant head differences cannot be maintained between nearby fractures, or (b) there are no significant head differences among any of the fractures in the vicinity of the impoundment. The latter discussion would be very difficult, requiring heads to be measured in a large number of individually packed-off fractures.

4.2.2.8 Cleanup at Closure

Operation of the facility in a way that guarantees "no migration" requires pumping, and the pumping cannot be relied upon to continue after active operation ceases. A complete cleanup of contamination is therefore required at closure. Because such processes as molecular diffusion, capillarity, and osmosis can move contamination against the gradient into clay around an impoundment, the cleanup must include sampling and any necessary removal of liners and surrounding natural materials. As noted, closure below the ground water may be quite difficult to accomplish due to the constant influx of water

while removal or decontamination is proceeding. Reviewers should ensure that site closure plans take account of the special nature of the required cleanup and that they provide necessary funding.

4.2.2.9 Sites with Vulnerable Hydrogeology

Another factor to be considered for an impoundment with an "inward gradient design" is the hydrogeologic setting surrounding the unit. In response to the requirements of Section 3004(o)(7) of RCRA, the Agency will soon publish a document entitled Guidance Criteria for Identifying Areas of Vulnerable Hydrogeology. This guidance will present a method for recognizing a vulnerable hydrogeologic setting at a hazardous waste landfill, surface impoundment, and waste pile. Vulnerability will be determined by calculating the time of travel of ground water along a 100-foot-long ground-water flow line originating at the base of the unit. Sites with a long time of travel are considered to be less vulnerable that those with shorter times.

The success of an inward gradient design in preventing migration of hazardous constituents should not rest solely with the factors listed in the preceding sections. Short-term failure to continually maintain the inward gradient can occur due to pump or electrical failure, operator error, or other factors. These problems can be buffered when the unit is located in a nonvulnerable hydrogeologic setting. In such an area, EPA believes that gradient reversals (due to short-term failures in operational controls) that would lead to the migration of hazardous constituents are unlikely to occur. In addition, the flux of ground water entering the unit due to the inward gradient would be minimal in such areas, thereby minimizing the demand on the pumps to maintain a given fluid level.

The Guidance Criteria for Identifying Areas of Vulnerable Hydrogeology will present a method for determining the vulnerability of both disposal units and units from which wastes are certain to be removed at closure. The method applicable to disposal units should be used as a factor in evaluating exemption applications based on inward gradients. Finally, the ground water

travel times that should be calculated are those that would occur naturally from the base of the impoundment in the absence to maintain an inward gradient.

4.2.3 Changes in Conditions Causing an Exemption to be Revoked

As described previously, surface impoundments exempted under Section 3005(j)(4) will become subject to the retrofitting requirements of (j)(1) if the impoundment no longer satisfies the provisions for the exemption. Changes in conditions that could cause revocation would include the identification of facts that would invalidate any of the assumptions used in the modeling analysis, ground water monitoring results indicating contamination, and new information on hydrogeology.

SECTION 5

FOURTH EXEMPTION

5.1 STATUTORY PROVISIONS

A fourth exemption to the surface impoundment retrofitting requirements of Section 3005(j)(1) is found in 3005(j)(13):

> The Administrator may modify the requirements of paragraph (1) in the case of a surface impoundment for which the owner or operator, prior to October 1, 1984, has entered into, and is in compliance with, a consent order, decree, or agreement with the Administrator or a State with an authorized program mandating corrective action with respect to such surface impoundment that provides a degree of protection of human health and the environment which is at a minimum equivalent to that provided by paragraph (1).

5.2 GUIDANCE FOR THE FOURTH EXEMPTION

To qualify for the fourth exemption, an owner or operator must have entered into an enforceable agreement with EPA or the State (as appropriate). Each of the following steps toward reaching the agreement should have been completed before October 1, 1984, in order for EPA to consider that the owner/operator had entered into it prior to that date:

- Oral understanding between the owner/operator and the regulatory authority;
- Reduction of the understanding to written form;
- Signature of the owner/operator; and
- Signature of the appropriate government official.

Although EPA is not aware of any unsigned agreements, it is conceivable that such an agreement would not have been signed by the parties even though it had been implemented. In order to be eligible for this exemption in such a case, the agreement should be written rather than verbal and it should be confirmed by all parties.

The steps above should also have been completed by October 1, 1984, in cases where court orders, decrees, or consent judgments are involved.

However, two additional steps are necessary in cases that involve court jurisdiction, although the steps do not necessarily have to have been completed by October 1, 1984. The two additional steps are:

- o Submission to a court with jurisdiction; and
- o Approval and entry by the court.

In order to be eligible for this exemption, an owner/operator should be in compliance with an agreement that meets all the criteria outlined in this guidance at the time the exemption is granted. EPA must be able to judge the compliance status at the time of the application and thereafter; for that reason, the agreement should contain performance criteria that are measurable and that must be met on a specified schedule. Finally, the agreement should be mandatory and enforceable under applicable law: the court or responsible government official must be able to invoke specified penalties and/or renegotiate the agreement in the case of noncompliance. If the agreement is renegotiated after October 1, 1984, however, a facility is not eligible for this exemption because EPA considers that a renegotiated agreement was "entered into" when it was renegotiated.

The agreement must require corrective action that protects human health and the environment to a degree equivalent to the Minimum Technological Requirements of Section 3004(o)(1)(A) of RCRA. For surface impoundments, the Minimum Technological Requirements require a double liner system, a leachate collection system between the liners, and ground water monitoring. The primary goal of these requirements is to prevent migration of hazardous constituents from hazardous waste treatment, storage, and disposal (TSD) units and to detect the inception of leaching and migration if it occurs.

It is EPA's position that in order to provide equivalent protection, an agreement should be intended to control leachate movement for a period of time equivalent to that of the Minimum Technological Requirements. Site conditions at the end of the agreement should be at least equivalent to those of a normal closure plan. EPA expects that either the agreement will provide for closure or that the closure requirements in current regulations will apply. For storage impoundments, clean closure should be required: all hazardous wastes,

all liner materials, and all contaminated soil (including saturated soils) must be decontaminated or removed. For disposal impoundments, contaminant levels in the ground water plume at the point of compliance should have been reduced to levels that do not exceed any ground water protection standards under 40 CFR 264.92; in addition, a cover of EPA-recommended design must be required at closure. Finally, in order to allow the success of the corrective action program to be assessed, a ground water monitoring program that is functionally equivalent to the requirements of 40 CFR Part 264 Subpart F should have been installed at the time of permitting.

In the case of an agreement between the owner/operator and a State, the State should have been at least a Phase I authorized State with the authority to enter into and enforce such agreements.

REFERENCES

Clark, J. W., et al. Water Supply and Pollution Control. Harper and Row Publishers, New York. 1977.

Freeze, R. A., and J. A. Cherry. Groundwater. Prentice-Hall, Inc., Inglewood Cliffs, N.J. 604pp.

Ross, Benjamin. Can Inward Gradients Guarantee "No Migration" from a Surface Impoundment. Report prepared by Disposal Safety, Inc., for U.S. EPA, Office of Solid Waste, Land Disposal Branch, under contract number 68-01-7237. 1985.

U.S. Environmental Protection Agency. Draft RCRA Guidance Document: Surface Impoundments, Liner Systems, Final Cover, and Freeboard Control. July 1982a.

U.S. Environmental Protection Agency. Test Methods for Evaluating Solid Waste. SW-846. U.S. Government Printing Office, Washington, D.C. Stock no. 055-002-81001-2. Second edition, July 1982b.

U.S. Environmental Protection Agency. Office of Solid Waste and Emergency Response. Ground Water Monitoring Guidance for Owners and Operators of Interim Status Facilities. SW-963. March 1983.

U.S. Environmental Protection Agency. Permit Writer's Guidance Manual for Subpart F, Ground Water Protection. Washington, D.C. 1983.

U.S. Environmental Protection Agency. Procedures for Modeling Flow Through Clay Liners to Determine Liner Thickness. EPA-530/SW-84-001. U.S. Government Printing Office, Washington, D.C. April, 1984a.

U.S. Environmental Protection Agency. Permit Applicants Guidance Manual for Hazardous Waste Land Treatment, Storage and Disposal Facilities. EPA 530/SW-84-004. Washington, D.C. 1984b.

U.S. Environmental Protection Agency. Draft RCRA Ground Water Monitoring Enforcement Guidance Document. Available from U.S. EPA Office of Waste Programs Enforcement, Washington, D.C. (202) 475-9320. 1985 (August).

U.S. Environmental Protection Agency. Guidance on Implementation of the Minimum Technological Requirements of HSWA of 1984, Respecting Liners and Leachate Collection Systems. EPA/530-SW-85-012. U.S. EPA, Office of Solid Waste, 401 M St. S.W., Washington, D.C. 20003. 1985a (May 24).

U.S. Environmental Protection Agency. Draft Minimum Technology Guidance on Double Liner Systems for Landfills and Surface Impoundments--Design, Construction, and Operation. EPA/530-SW-85-014. U.S. EPA, Office of Solid Waste, 401 M St. S.W., Washington, D.C. 20003. 1985b (May 24).

U.S. Environmental Protection Agency. Soil Properties, Classification, and Hydraulic Conductivity. SW-925. Available from Docket Desk; U.S. EPA Office of Solid Waste; 401 M Street S.W.; Washington, D.C. 20003.

APPENDIX A

HAZARDOUS AND SOLID WASTE AMENDMENTS OF 1984 (PL 98-616)
SECTION 215

Sec. 215. Section 3005 of the Solid Waste Disposal Act is amended by adding the following new subsection after subsection (i):

"(j) INTERIM STATUS SURFACE IMPOUNDMENTS.-(1) Except as provided in paragraph (2), (3), or (4), each surface impoundment in existence on the date of enactment of the Hazardous and Solid Waste Amendments of 1984 and qualifying for the authorization to operate under subsection (e) of this section shall not receive, store, or treat hazardous waste after the date four years after such date of enactment unless such surface impoundment is in compliance with the requirements of section 3004(o)(1)(A) which would apply to such impoundment if it were new.

"(2) Paragraph (1) of this subsection shall not apply to any surface impoundment which (A) has at least one liner, for which there is no evidence that such liner is leaking; (B) is located more than one-quarter mile from an underground source of drinking water; and (C) is in compliance with generally applicable ground water monitoring requirements for facilities with permits under subsection (c) of this section.

"(3) Paragraph (1) of this subsection shall not apply to any surface impoundment which (A) contains treated waste water during the secondary or subsequent phases of an aggressive biological treatment facility subject to a permit issued under section 402 of the Clean Water Act (or which holds such treated waste water after treatment and prior to discharge); (B) is in compliance with generally applicable ground water monitoring requirements for facilities with permits under subsection (c) of this section; and (C)(i) is part of a facility in compliance with section 301(b)(2) of the Clean Water Act, or (ii) in the case of a facility for which no effluent guidelines required under section 304(b)(2) of the Clean Water Act are in effect and no permit under section 402(a)(1) of such Act implementing section 301(b)(2) of such Act has been issued, is part of a facility in compliance with a permit under section 402 of such Act, which is achieving significant degradation of toxic pollutants and hazardous constituents contained in the untreated waste stream and which has identified those toxic pollutants and hazardous constituents to the appropriate permitting authority.

"(4) The Administrator (or the State, in the case of a State with an authorized program), after notice and opportunity for comment, may modify the requirements of paragraph (1) for any surface impoundment if the owner or operator demonstrates that such is located, designed and operated so as to assure that there will be no migration of any hazardous constituent into ground water or surface water at any future time. The Administrator or the State shall take into account locational criteria established under section 3004(o)(7).

"(5) The owner or operator of any surface impoundment potentially subject to paragraph (1) who has reason to believe that on the basis of paragraph (2), (3), or (4) such surface impoundment is not required to comply with the requirements of paragraph (1), shall apply to the Administrator (or the State, in the case of a State with an authorized program) not later than twenty-four months after the date of enactment of the Hazardous and Solid Waste Amendments of 1984 for a determination of the applicability of paragraph (1) (in the case of paragraph (2) or (3)) or for a modification of the

requirements of paragraph (1) (in the case of paragraph (4)), with respect to such surface impoundment. Such owner or operator shall provide, with such application, evidence pertinent to such decision, including:

"(A) an application for a final determination regarding the issuance of a permit under subsection (c) of this section for such facility, if not previously submitted;

"(B) evidence as to compliance with all applicable ground water monitoring requirements and the information and analysis from such monitoring;

"(C) all reasonably ascertainable evidence as to whether such surface impoundment is leaking; and

"(D) in the case of applications under paragraph (2) or (3), a certification by a registered professional engineer with academic training and experience in ground water hydrology that-

"(i) under paragraph (2), the liner of such surface impoundment is designed, constructed, and operated in accordance with applicable requirements, such surface impoundment is more than one-quarter mile from an underground source of drinking water and there is no evidence such liner is leaking; or

"(ii) under paragraph (3), based on analysis of those toxic pollutants and hazardous constituents that are likely to be present in the untreated waste stream, such impoundment satisfies the conditions of paragraph (3).

In the case of any surface impoundment for which the owner or operator fails to apply under this paragraph within the time provided by this paragraph or paragraph (6), such surface impoundment shall comply with paragraph (1) not withstanding paragraph (2), (3), or (4). Within twelve months after receipt of such application and evidence and not later than thirty-six months after such date of enactment, and after notice and opportunity to comment, the Administrator (or, if appropriate, the State) shall advise such owner or operator on the applicability of paragraph (1) to such surface impoundment or as to whether and how the requirements of paragraph (1) shall be modified and applied to such surface impoundment.

"(6)(A) In any case in which a surface impoundment becomes subject to paragraph (1) after the date of enactment of the Hazardous and Solid Waste Amendments of 1984 due to the promulgation of additional listings or characteristics for the identification of hazardous waste under section 3001, the period for compliance in paragraph (1) shall be four years after the date of such promulgation, the period for demonstrations under paragraph (4) and for submission of evidence under paragraph (5) shall be not later than twenty-four months after the date of such promulgation and the period for the Administrator (or, if appropriate, the State) to advise such owners or operators under paragraph (5) shall be not later than thirty-six months after the date of promulgation.

"(B) In any case in which a surface impoundment is initially determined to be excluded from the requirements of paragraph (1) but due to a change in condition (including the existence of a leak) no longer satisfies the provisions of paragraph (2), (3), or (4) and therefore becomes subject to paragraph (1), the period for compliance in paragraph (1) shall be two years after the date of discovery of such change of condition, or in the case of a surface impoundment excluded under paragraph (3) three years after such date of discovery.

"(7)(A) The Administrator shall study and report to the Congress on the number, range of size, construction, likelihood of hazardous constituents migrating into ground water, and potential threat to human health and the environment of existing surface impoundments excluded by paragraph (3) from the requirements of paragraph (1). Such report shall address the need, feasibility, and estimated costs of subjecting such existing surface impoundments to the requirements of paragraph (1).

"(B) In the case of any existing surface impoundment or class of surface impoundments from which the Administrator (or the State in, the case of a State with an authorized program) determines hazardous constituents are likely to migrate into ground water, the Administrator (or, if appropriate, the State) is authorized to impose such requirements as may be necessary to protect human health and the environment, including the requirements of section 3004(o) which would apply to such impoundments if they were new.

"(C) In the case of any surface impoundment excluded by paragraph (3) from the requirements of paragraph (1) which is subsequently determined to be leaking, the Administrator (or, if appropriate, the State) shall require compliance with paragraph (1), unless the Administrator (or, if appropriate, the State) determines that such compliance is not necessary to protect human health and the environment.

"(8) In the case of any surface impoundment in which the liners and leak detection system have been installed pursuant to the requirements of paragraph (1) and in good faith compliance with section 3004(o) and the Administrator's regulations and guidance documents governing liners and leak detection systems, no liner or leak detection system which is different from that which was so installed pursuant to paragraph (1) shall be required for such unit by the Administrator when issuing the first permit under this section to such facility. Nothing in this paragraph shall preclude the Administrator from requiring installation of a new liner when the Administrator has reason to believe that any liner installed pursuant to the requirements of this subsection is leaking.

"(9) In the case of any surface impoundment which has been excluded by paragraph (2) on the basis of a liner meeting the definition under paragraph (12)(A)(ii), at the closure of such impoundment the Administrator shall require the owner or operator of such impoundment to remove or decontaminate all waste residues, all contaminated liner material, and contaminated soil to the extent practicable. If all contaminated soil is not removed or decontaminated, the owner or operator of such impoundment shall be required to comply with appropriate post-closure requirements, including but not limited to ground water monitoring and corrective action.

"(10) Any incremental cost attributable to the requirements of this subsection or section 3004(o) shall not be considered by the Administrator (or the State, in the case of a State with an authorized program under section 402 of the Clean Water Act)-

"(A) in establishing effluent limitations and standards under section 301, 304, 306, 307, or 402 of the Clean Water Act based on effluent limitations guidelines and standards promulgated any time before twelve months after the date of enactment of the Hazardous and Solid Waste Amendments of 1984; or

"(B) in establishing any other effluent limitations to carry out the provisions of section 301, 307, or 402 of the Clean Water Act on or before October 1, 1986.

"(11)(A) If the Administrator allows a hazardous waste which is prohibited from one or more methods of land disposal under subsection (d), (e), or (g) of section 3004 (or under regulations promulgated by the Administrator under such subsections) to be placed in a surface impoundment (which is operating pursuant to interim status) for storage or treatment, such impoundment shall meet the requirements that are applicable to new surface impoundments under section 3004(o)(1), unless such impoundment meets the requirements of paragraph (2) or (4).

"(B) In the case of any hazardous waste which is prohibited from one or more methods of land disposal under subsection (d), (e), or (g) of section 3004 (or under regulations promulgated by the Administrator under such subsection) the placement or maintenance of such hazardous waste in a surface impoundment for treatment is prohibited as of the effective date of such prohibition unless the treatment residues which are hazardous are, at a minimum, removed for subsequent management within one year of the entry of the waste into the surface impoundment.

"(12)(A) For the purposes of paragraph (2)(A) of this subsection, the term 'liner' means-

"(i) a liner designed, constructed, installed, and operated to prevent hazardous waste from passing into the liner at any time during the active life of the facility; or

"(ii) a liner designed, constructed, installed, and operated to prevent hazardous waste from migrating beyond the liner to adjacent subsurface soil, ground water, or surface water at any time during the active life of the facility.

"(B) For the purposes of this subsection, the term 'aggressive biological treatment facility' means a system of surface impoundments in which the initial impoundment of the secondary treatment segment of the facility utilizes intense mechanical aeration to enhance biological activity to degrade waste water pollutants and

"(i) the hydraulic retention time in such initial impoundment is no longer than 5 days under normal operating conditions, on an annual average basis;

"(ii) the hydraulic retention time in such initial impoundment is no longer than thirty days under normal operating conditions, on an annual average basis: Provided. That the sludge in such impoundment does not constitute a hazardous waste as identified by the extraction procedure toxicity characteristic in effect on the date of enactment of the Hazardous and Solid waste Amendments of 1984; or

"(iii) such system utilizes activated sludge treatment in the first portion of secondary treatment.

"(C) For the purposes of this subsection, the term 'underground source of drinking water' has the same meaning as provided in regulations under the Safe Drinking Water Act (title XIV of the Public Health Service Act).

"(13) The Administrator may modify the requirements of paragraph (1) in the case of a surface impoundment for which the owner or operator, prior to October 1, 1984, has entered into, and is in compliance with, a consent order, decree, or agreement with the Administrator or a State with an authorized program mandating corrective action with respect to such surface impoundment that provides a degree of protection of human health and the environment which is at a minimum equivalent to that provided by paragraph (1)."

APPENDIX B

POTENTIAL SOURCES OF INFORMATION ON THE LOCATION OF AQUIFERS IDENTIFIED AS UNDERGROUND SOURCES OF DRINKING WATER

ALABAMA

State Agency Contacts:

Mr. John Poole, Chief
Ground-Water Section
Department of Environmental Management
1751 Federal Drive
Montgomery, AL 36130
(205) 271-7832

Mr. David Bolin
UIC Coordinator
State Oil and Gas Board of Alabama
Drawer "O"
University, AL 35486
(205) 349-2852

EPA Contact:

Mr. Bill Taylor
UIC Representative
U.S. EPA, Region IV
345 Courtland Street
Atlanta, GA 30365
FTS 257-3866 (404) 347-3866

ALASKA

State Agency Contact:

C. V. Chatterton, Chairman
Chairman, Oil & Gas Conservation Commission
3001 Porcupine Drive
Anchorage, AK 99501
(208) 334-4440

Mr. Richard Neve
Commissioner, Department of Environmental Conservation
Pouch O
Juneau, AK 99811
(907) 456-2600

EPA Contact:

Mr. Jerry Opatz
UIC Representative
U.S. EPA, Region X
1200 Sixth Avenue
Seattle, WA 98101
FTS 399-4092 (206) 442-1225

ARIZONA

State Agency Contacts:

Mr. Chuck Anders
Department of Health Services
1740 West Adams Street
Phoenix, AZ 85007
(602) 255-1177

Mr. Rudy Ybarra
Oil and Gas Conservation Commission
1645 West Jefferson, Suite 420
Phoenix, AZ 85007
(602) 255-5161

EPA Contact:

Mr. Nathan Lau
UIC Representative
U.S. EPA, Region IX
215 Fremont Street
San Francisco, CA 94105
FTS 454-8267 (415) 974-7284

ARKANSAS

State Agency Contacts:

Mr. A. L. Spark
Department of Pollution Control and Ecology
Water Division
8001 National Drive
Little Rock, AR 72209
(501) 562-7444

Mr. David Morrow
Oil and Gas Commission
314 East Oak Street
El Dorado, AR 71720
(501) 862-4965

EPA Contact:

Mr. Bill Honker
U.S. EPA, Region VI
1201 Elm Street
Dallas, TX 75270
FTS 729-2774 (214) 767-2600

CALIFORNIA

State Agency Contacts:

Mr. Mike Campos
State Water Resources Control Board
P.O. Box 100
Sacramento, CA 95801
(916) 322-3133

Mr. M. G. Mefferd
Division of Oil and Gas
1416 Ninth Street, Room 1310
Sacramento, CA 95814
(916) 445-9686

EPA Contact:

Mr. Nathan Lau
UIC Representative
U.S. EPA, Region IX
215 Fremont Street
San Francisco, CA 94105
FTS 454-8267 (415) 974-7284

COLORADO

State Agency Contacts:

Mr. William Smith
Colorado Oil & Gas Conservation Commission
Colorado Dept. of Natural Resources
1313 Sherman Street - 7th Floor
Denver, CO
(303) 866-3531

Mr. Rick Karlin
Colorado Department of Health
4210 East 11th Avenue
Denver, CO 80220
(303) 320-8333 Ext. 3453

EPA Contact:

Mr. Patrick Crotty
U.S. EPA, Region VIII
1860 Lincoln Street
Denver, CO 80295
FTS 564-1542 (303) 837-2731

CONNECTICUT

State Agency Contact:
Mr. Wesley Winterbottom
Water Compliance Unit
Department of Environmental Protection
122 Washington Street
Hartford, CT 06106
(203) 556-5903

EPA Contact:
Mr. Greg Charest
UIC Representative
U.S. EPA, Region I
JFK Federal Building
Boston, MA 02203
FTS 223-5529 (617) 223-6486

DELAWARE

State Agency Contact:
Mr. Philip Cherry
Department of Natural Resources and Environmental Control
P.O. Box 1402
Dover, DE 19903
(302) 736-5741

EPA Contact:
Mr. George Hoessel
UIC Representative
U.S. EPA, Region III
841 Chestnut Building
Philadelphia, PA 19106
FTS 597-9800 (215) 597-9800

DISTRICT OF COLUMBIA

Local Agency Contact:
Mr. William B. Johnson
Director, Department of Environmental Services
5000 Overlook Avenue, S.W.
Washington, DC 20032
(202) 629-3415

EPA Contact:
Mr. George Hoessel
UIC Representative
U.S. EPA, Region III
841 Chestnut Building
Philadelphia, PA 19106
FTS 597-9800 (215) 597-9800

FLORIDA

State Agency Contacts:
Dr. Rodney DeHan
Assistant Bureau Chief
Department of Environmental Regulation
Twin Towers Office Bldg.
2600 Blair Stone Road
Tallahassee, FL 32301-8241
(904) 488-3601

Mr. David Curry
Department of Natural Resources
Bureau of Geology
903 W. Tennessee
Tallahassee, FL 32304
(904) 488-2219

EPA Contact:
Mr. Bill Taylor
UIC Representative
U.S. EPA, Region IV
345 Courtland Street
Atlanta, GA 30365
FTS 257-3866 (404) 347-3866

GEORGIA

State Agency Contact:
Mr. William H. McLemore, Ph.D
State Geologist
UIC Program Manager
Georgia Geologic Survey
19 Martin Luther King, Jr., Drive
Atlanta, GA 30334
(404) 656-3214

EPA Contact:
Mr. Bill Taylor
UIC Representative
U.S. EPA, Region IV
345 Courtland Street
Atlanta, GA 30365
FTS 257-3866 (404) 347-3866

GUAM

State Agency Contact:
Mr. Jim Branch
Environmental Protection Agency
P.O. Box 2999
Agana, Guam 96910
0-11-671-646-8863

EPA Contact:
Mr. Nathan Lau
UIC Representative
U.S. EPA, Region IX
215 Fremont Street
San Francisco, CA 94105
FTS 454-8267 (415) 974-7284

HAWAII

State Agency Contact:
Mr. Mel Koizumi
Department of Health
P.O. Box 3378
Honolulu, HI 96801
(808) 548-6767

EPA Contact:
Mr. Nathan Lau
UIC Representative
U.S. EPA, Region IX
215 Fremont Street
San Francisco, CA 94105
FTS 454-8267 (415) 974-7284

IDAHO

State Agency Contact:
Mr. A. Kenneth Dunn, Director
Director, Department of Water Resources
Statehouse
Boise, ID 83720
(208) 554-4479

EPA Contact:
Mr. Jerry Opatz
UIC Representative
U.S. EPA, Region X
1200 Sixth Avenue
Seattle, WA 98101
FTS 399-4092 (206) 442-1225

ILLINOIS

State Agency Contacts:
Mr. Bill Radlinski
Illinois Environmental Protection Agency
Division of Land/Noise Pollution Control
2200 Churchill Road
Springfield, IL 62706
(217) 782-9898

EPA Contact:
Mr. John Taylor
UIC Representative
U.S. EPA, Region V
230 South Dearborn Street
Chicago, IL 60604
FTS 886-1502 (312) 353-2151

Mr. George R. Lane
Department of Mining and Minerals
Oil and Gas Division
William G. Stratton Office Building
400 South Spring Street
Springfield, IL 62706
(217) 782-7756

INDIANA

State Agency Contacts:

Mr. Earl Bohner
Indiana State Board of Health
1330 W. Michigan Street
Indianapolis, IN 46206
(317) 633-0735

Mr. Gary Fricke
Division of Oil and Gas
911 State Office Building
Indianapolis, IN 46206
(217) 232-4055

EPA Contact:

Mr. John Taylor
UIC Representative
U.S. EPA, Region V
230 South Dearborn Street
Chicago, IL 60604
FTS 886-1502 (312) 353-2151

IOWA

State Agency Contacts:

Mr. Darrell McAllister
Director, Program Development
Divison
Iowa Department of Water, Air &
Waste Management
Henry A. Wallace State Office Bldg.
900 East Grand
Des Moines, IA 50319
(515) 281-8692

Mr. Morris Preston
Chief, Water Resource Development
Branch
Iowa Department of Water, Air &
Waste Management
Henry A. Wallace State Office Bldg.
900 East Grand
Des Moines, IA 50319
(515) 281-8877

EPA Contact:

Harold Owens, Chief
Ground Water Section
U.S. EPA, Region VII
726 Minnesota Ave.
Kansas City, MO 66101
(913) 236-2808

KANSAS

State Agency Contacts:

Mr. William R. Bryson
Manager, Bureau of Oil Field
& Environmental Geology
Kansas Department of Health &
Environment
Forbes Field, Bldg. 740
Topeka, KS 66620
(913) 862-9360 Ext. 219

Mr. Jim Schoof
Oil and Gas Conservation Division
Kansas Corporation Commission
200 Colorado/Derby Bldg.
212 West First Street
Wichita, KS 67202
(316) 263-2027

EPA Contact:

Mr. Harold Owens
Chief, Ground Water Section
U.S. EPA, Region VII
726 Minnesota Ave.
Kansas City, MO 66101
FTS 757-2812 (913) 236-2808

KENTUCKY

State Agency Contacts:

Mr. Donald S. Harker, Jr.
Director
Water Management Division
KY Natural Resources and
Environmental Protection Cabinet
Fort Boone Plaza
18 Reill Road
Frankfort, KY 40601
(502) 564-3410

Mr. Henry Morgan
Director
Oil and Gas Division
Dept. of Mines and Minerals
P.O. Box 680
Lexington, KY 40586
(606) 254-0367

EPA Contact:

Mr. Bill Taylor
UIC Representative
U.S. EPA, Region IV
345 Courtland Street
Atlanta, GA 30365
FTS 257-3866 (404) 347-3866

LOUISIANA

State Agency Contacts:

Mr. Jim Welsh
Director, UIC and Mining Division
Office of Conservation
Department of Natural Resources
P.O. Box 44275
Baton Rouge, LA 70804

EPA Contact:

Mr. Bill Honker
U.S. EPA, Region VI
1201 Elm Street
Dallas, TX 75270
FTS 729-2774 (214) 767-2600

Mr. Fritz Spencer
Department of Natural Resources
Office of Conservation
P.O. Box 44275
Baton Rouge, LA 70804
(504) 342-5515

MAINE

State Agency Contact:
Mr. Robert Nunan
Division of Environmental Evaluation and Lake Standards
Maine Department of Environmental Protection
Statehouse, Station 17
Augusta, ME 04333
(207) 289-2437

EPA Contact:
Mr. Greg Charest
UIC Representative
U.S. EPA, Region I
JFK Federal Building
Boston, MA 02203
FTS 223-5529 (617) 223-6486

MARYLAND

State Agency Contact:
Mr. Larry Leasner
Department of Health and Mental Hygiene
Office of Environmental Programs
201 West Preston Street
Baltimore, MD 21201
FTS 932-5740 (301) 383-5740

EPA Contact:
Mr. George Hoessel
UIC Representative
U.S. EPA, Region III
841 Chestnut Building
Philadelphia, PA 19106
FTS 597-9800 (215) 597-9800

MASSACHUSETTS

State Agency Contact:
Mr. Mark Pare
Division of Water Pollution Control
Department of Environmental Quality Engineering
One Winter Street
Boston, MA 02108
(617) 292-5698

EPA Contact:
Mr. Greg Charest
UIC Representative
U.S. EPA, Region I
JFK Federal Building
Boston, MA 02203
FTS 223-5529 (617) 223-6486

MICHIGAN

State Agency Contact:
Mr. Tom Segall
Michigan Department of Natural Resources
Geological Survey Division
Stevens T. Mason Building
Lansing, MI 48926
(517) 373-8014

EPA Contact:
Mr. John Taylor
UIC Representative
U.S. EPA, Region V
230 South Dearborn Street
Chicago, IL 60604
FTS 886-1502 (312) 353-2151

MINNESOTA

State Agency Contact:
Mr. John Holck
Minnesota Pollution Control Agency
1935 W. Country Road B-2
Roseville, MN 55113
(612) 296-7787

EPA Contact:
Mr. John Taylor
UIC Representative
U.S. EPA, Region V
230 South Dearborn Street
Chicago, IL 60604
FTS 886-1502 (312) 353-2151

MISSISSIPPI

State Agency Contact:
Mr. Fred Hille
Bureau of Pollution Control
P.O. Box 10385
Jackson, MS 39209
(601) 961-5171

EPA Contact:
Mr. Bill Taylor
UIC Representative
U.S. EPA, Region IV
345 Courtland Street
Atlanta, GA 30365
FTS 257-3866 (404) 347-3866

MISSOURI

State Agency Contacts:
Mr. Kenneth Deason
Department of Natural Resources
Division of Geology and Land Survey
111 Fairgrounds Road
Rolla, MO 65401
(314) 364-1752

Mr. Gordon Ackley
Department of Natural Resources
Division of Environmental Quality
2010 Missouri Boulevard
Jefferson City, MO 65102
(314) 751-3241

EPA Contact:
Mr. Harold Owens
Chief, Ground Water Section
U.S. EPA, Region VII
726 Minnesota Ave.
Kansas City, MO 66101
FTS 757-2812 (913) 236-2808

MONTANA

State Agency Contacts:
Mr. Charles Maio
Montana Oil & Gas Conservation Commission
2535 St. Johns Avenue
Billings, MT 59101
(406) 656-0040

Mr. Steve Pilcher
Water Quality Bureau
Dept. of Health & Environmental Sciences
Cogswell Bldg.
Billings, MT
(406) 499-2406

EPA Contact:
Mr. Patrick Crotty
U.S. EPA, Region VIII
1860 Lincoln Street
Denver, CO 80295
FTS 564-1542 (303) 837-2731

NEBRASKA

State Agency Contacts:
Mr. Jay Ringenberg
Chief (1422), Permits/Licenses Section
Nebraska Dept. of Environmental Control
P.O. Box 94877, Statehouse Stn.
Lincoln, NE 65809
(402) 471-2186

Mr. Paul Roberts
Director (1425), Oil & Gas Conservation Commission
P.O. Box 399
Sidney, NE
(308) 254-4595

EPA Contact:
Harold Owens
Chief, Ground Water Section
U.S. EPA, Region VII
726 Minnesota Ave.
Kansas City, MO 66101
FTS 757-2812 (913) 236-2808

NEW HAMPSHIRE

State Agency Contact:
Mr. Michael A. Sills, P.E.
Ground Water Protection Division
Ground Water Supply and Pollution Control Commission
P.O. Box 95, Hazen Drive
Concord, NH 03301
(603) 271-2755

EPA Contact:
Mr. Greg Charest
UIC Representative
U.S. EPA, Region I
JFK Federal Building
Boston, MA 02203
FTS 223-5529 (617) 223-6486

NEW JERSEY

State Agency Contact:
Mr. Wayne Hutchinson
Program Manager
New Jersey Geological Survey
New Jersey Department of Environmental Protection
P.O. Box CN-029
Trenton, NJ 08625
(609) 292-0668

EPA Contact:
Mr. Peter Acker
UIC Representative
U.S. EPA, Region II
Federal Building
26 Federal Plaza
New York City, NY 10278
FTS 264-1800 (212) 264-1800

NEW MEXICO

State Agency Contacts:
Paige Morgan
Environmental Improvement Division
P.O. Box 968
Sante Fe, NM 87503
(505) 984-0020 Ex 281

EPA Contact:
Mr. Bill Honker
U.S. EPA, Region VI
1201 Elm Street
Dallas, TX 75270
FTS 729-2774 (214) 767-2600

Prentiss Morgan
Oil Conservation Division
P.O. Box 2088
Sante Fe, NM 87501
(505) 827-2434

NEW YORK

State Agency Contacts:
Mr. Daniel Barolo
Director, Division of Water
Department of Environmental Conservation
50 Wolf Road
Albany, NY 12233
(518) 457-6674

Mr. Gregory Sovas
Director, Division of Mineral Resources
Department of Environmental Conservation
50 Wolf Road
Albany, NY 12233
(518) 457-9337

EPA Contact:
Mr. Peter Acker
UIC Representative
U.S. EPA, Region II
Federal Building
26 Federal Plaza
New York City, NY 10278
FTS 264-1800 (212) 264-1800

NORTH CAROLINA

State Agency Contact:
Mr. Perry Nelson
Groundwater Section
Division of Environmental Management
P.O. Box 27687
Raleigh, NC 27611
(919) 733-5083

EPA Contact:
Mr. Bill Taylor
UIC Representative
U.S. EPA, Region IV
345 Courtland Street
Atlanta, GA 30365
FTS 257-3866 (404) 347-3866

NORTH DAKOTA

State Agency Contacts:
Mr. Wesley Norton
Chief Enforcement Official
Oil and Gas Division
North Dakota Industrial Commission
900 East Boulevard
Bismarck, ND 58505
(701) 224-2969

EPA Contact:
Mr. Patrick Crotty
U.S. EPA, Region VIII
1860 Lincoln Street
Denver, CO 80295
FTS 564-1542 (303) 837-2731

Mr. Francis Schwindet
Director, Division of Water
Supply and Pollution Control
North Dakota Division of Health
1200 Missouri Ave.
Bismarck, ND 58501
(701) 224-4538

OHIO

State Agency Contacts:
Mr. Steve White
Ohio EPA
Hazardous Waste Division
Box 1049
361 E. Broad Street
Columbus, OH 43216
(614) 466-7220

Mr. Dennis Crist
Ohio Department of Natural Resources
Oil and Gas Division
Fountain Square, Building A
Columbus, OH 43224
(614) 265-6926

EPA Contact:
Mr. John Taylor
UIC Representative
U.S. EPA, Region V
230 South Dearborn Street
Chicago, IL 60604
FTS 886-1502 (312) 353-2151

OKLAHOMA

State Agency Contacts:
Mr. Donald Hensch
Department of Health
Industry and Solid Waste Service
P.O. Box 53551
Oklahoma City, OK 73152
(405) 271-5338

Mr. Tal Oden
Corporation Commission
UIC
Jim Thorpe Office Building
Oklahoma City, OK 73105
(405) 521-2500

EPA Contact:
Mr. Bill Honker
U.S. EPA, Region VI
1201 Elm Street
Dallas, TX 75270
FTS 729-2774 (214) 767-2600

OREGON

State Agency Contact:
Mr. Frederick J. Hansen
Director, Department of Environmental
Quality
P.O. Box 1760
522 S. W. Fifth Avenue
Portland, OR 97207
(503) 229-5395

EPA Contact:
Mr. Jerry Opatz
UIC Representative
U.S. EPA, Region X
1200 Sixth Avenue
Seattle, WA 98101
FTS 399-4092 (206) 442-1225

Mr. Donald Hull
State Geologist
Oregon Department of Geology and
Mineral Industries
1005 State Office Building
1440 S. W. Fifth Avenue
Portland, OR 97201
(503) 229-5580

PENNSYLVANIA

State Agency Contact:
Mr. Lewis Berchini
Department of Environmental
Resources
P.O. Box 2060
Harrisburg, PA 17120
(717) 787-2666

EPA Contact:
Mr. George Hoessel
UIC Representative
U.S. EPA, Region III
841 Chestnut Building
Philadelphia, PA 19106
FTS 597-9800 (215) 597-9800

PUERTO RICO

Agency Contact:
Mr. Carl Axel P. Soderberg
Vice Chairman
Environmental Quality Board
Box 11488
Santurce, Puerto Rico 00910-1488

EPA Contact:
Mr. Peter Acker
UIC Representative
U.S. EPA, Region II
Federal Building
26 Federal Plaza
New York City, NY 10278
FTS 264-1800 (212) 264-1800

RHODE ISLAND

State Agency Contact:
Mr. Michael Annarummo
Industrial Facilities and Monitoring
Division of Water Resources
Department of Environmental
Management
75 Davis Street, Health Building
Providence, RI 02908
(401) 277-2234

EPA Contact:
Mr. Greg Charest
UIC Representative
U.S. EPA, Region I
JFK Federal Building
Boston, MA 02203
FTS 223-5529 (617) 223-6486

SOUTH CAROLINA

State Agency Contact:
Mr. Don Duncan
Groundwater Program
Water Supply Division
Environmental Quality Control
Department of Health and
Environmental Control
2600 Bull Street
Columbia, SC 29201
(803) 758-5213

EPA Contact:
Mr. Bill Taylor
UIC Representative
U.S. EPA, Region IV
345 Courtland Street
Atlanta, GA 30365
FTS 257-3866 (404) 347-3866

SOUTH DAKOTA

State Agency Contacts:

Mr. Mark Steichen
Director, Office of Drinking Water
Joe Foss Bldg.
Pierre, SD 57501
(605) 773-3754

Mr. Jim Nelson
Director, Division of Water and
Natural Resources
Joe Foss Bldg.
Pierre, SD 57501
(605) 344-2229

EPA Contact:

Mr. Patrick Crotty
U.S. EPA, Region VIII
1860 Lincoln Street
Denver, CO 80295
FTS 564-1542 (303) 837-2731

TENNESSEE

State Agency Contacts:

Mr. Terry K. Cothron
Director, Division of Ground-Water
Protection
Office of Water Management
Department of Health and Environment
T.E.R.R.A. Building, 7th Floor
150 Ninth Avenue, North
Nashville, TN 37219-5404
(615) 741-7206

EPA Contact:

Mr. Bill Taylor
UIC Representative
U.S. EPA, Region IV
345 Courtland Street
Atlanta, GA 30365
FTS 257-3866 (404) 347-3866

TEXAS

State Agency Contacts:

Mr. William Klemt
UIC Section
Department of Water Resources
P.O. Box 13087 - Capital Station
1700 North Congress Ave.
Austin, TX 78711
(512) 475-7098

Mr. Jerry Mullican
UIC Section
Railroad Commission
P.O. Box Drawer 12967
Capital Station
Austin, TX 78711
(512) 445-1373

EPA Contact:

Mr. Bill Honker
U.S. EPA, Region VI
1201 Elm Street
Dallas, TX 75270
FTS 729-2774 (214) 767-2600

UTAH

State Agency Contacts:
Ms. Dianne R. Nielson
Director, Division of Oil, Gas and Mining
Utah Dept. of Natural Resources & Energy
4241 State Office Bldg.
Salt Lake City, UT 84114
(801) 533-5771

Mr. Calvin Sudweeks
Director, Bureau of Water Pollution Control
Utah Department of Health
150 West North Temple
Salt Lake City, UT 84114
(801) 533-6146

EPA Contact:
Mr. Patrick Crotty
U.S. EPA, Region VIII
1860 Lincoln Street
Denver, CO 80295
FTS 564-1542 (303) 837-2731

VERMONT

State Agency Contact:
Mr. David Butterfield
Chief, Ground Water Management Section
Department of Water Resources and Environmental Engineering
Agency of Environmental Conservation
State Office Building
Montpelier, VT 05602
(802) 828-2761

EPA Contact:
Mr. Greg Charest
UIC Representative
U.S. EPA, Region I
JFK Federal Building
Boston, MA 02203
FTS 223-5529 (617) 223-6486

VIRGIN ISLANDS

Agency Contact:
Ms. Angel LeDron
Commissioner, Department of Conservation and Cultural Affairs
P.O. Box 4340
Charlotte Amalie, St. Thomas 00801
(809) 774-3320

EPA Contact:
Mr. Peter Acker
UIC Representative
U.S. EPA, Region II
Federal Building
26 Federal Plaza
New York City, NY 10278
FTS 264-1800 (212) 264-1800

VIRGINIA

State Agency Contacts:

Dr. James B. Kenley, M.D.
State Department of Health
State Health Commission
James Madison Bldg.
109 Governor Street
Richmond, VA 23219
(804) 786-5569

Mr. Tom Fulner
Assistant Commissioner
Department of Labor and Industry
205 North Fourth Street
Richmond, VA 23241
(703) 628-8115

Mr. Robert Taylor
State Department of Health
State Health Commission
James Madison Bldg.
109 Governor Street
Richmond, VA 23219
(804) 786-5569

EPA Contact:

Mr. George Hoessel
UIC Representative
U.S. EPA, Region III
841 Chestnut Building
Philadelphia, PA 19106
FTS 597-9800 (215) 597-9800

WASHINGTON

State Agency Contact:

Mr. Brian Boyle
Commissioner, Public Lands (M/S QW-21)
Public Lands Building
Department of Natural Resources
Olympia, WA 98504
(206) 753-5317

Mr. Ray Lasmanis
State Geologist
Division of Geology & Earth Resources
Department of Natural Resources
Olympia, WA 98504
(206) 459-6375

Ms. Karen Rahm
Secretary, Department of Social and
Health Services
Olympia, WA 98504
(206) 753-3395

Mr. Donald W. Moos
Director, Department of Ecology
Mail Stop PV-11
Olympia, WA 98504
(206) 459-6169

EPA Contact:

Mr. Jerry Opatz
UIC Representative
U.S. EPA, Region X
1200 Sixth Avenue
Seattle, WA 98101
FTS 399-4092 (206) 442-1225

WEST VIRGINIA

State Agency Contact:
Mr. Rick Melvin
Department of Natural Resources
1201 Greenbriar Street, East
Charleston, WV 25311
(304) 348-5935

EPA Contact:
Mr. George Hoessel
UIC Representative
U.S. EPA, Region III
841 Chestnut Building
Philadelphia, PA 19106
FTS 597-9800 (215) 597-9800

WISCONSIN

State Agency Contact:
Mr. Greg Becker
Wisconsin Department of
Natural Resources
Bureau of Water Supply
P.O. Box 7921
Madison, WI 53707
(608) 267-7652

EPA Contact:
Mr. John Taylor
UIC Representative
U.S. EPA, Region V
230 South Dearborn Street
Chicago, IL 60604
FTS 886-1502 (312) 353-2151

WYOMING

State Agency Contacts:
Mr. Donald Basko
Director, Oil & Gas Commission
P.O. Box 2640
Casper, WY 82602
(307) 234-7147

Mr. William Garland
Director, Department of
Environmental Quality
Water Quality Division
1111 E. Lincoln Way
Cheyenne, WY 82002
(307) 777-7781

EPA Contact:
Mr. Patrick Crotty
U.S. EPA, Region VIII
1860 Lincoln Street
Denver, CO 80295
FTS 564-1542 (303) 837-2731